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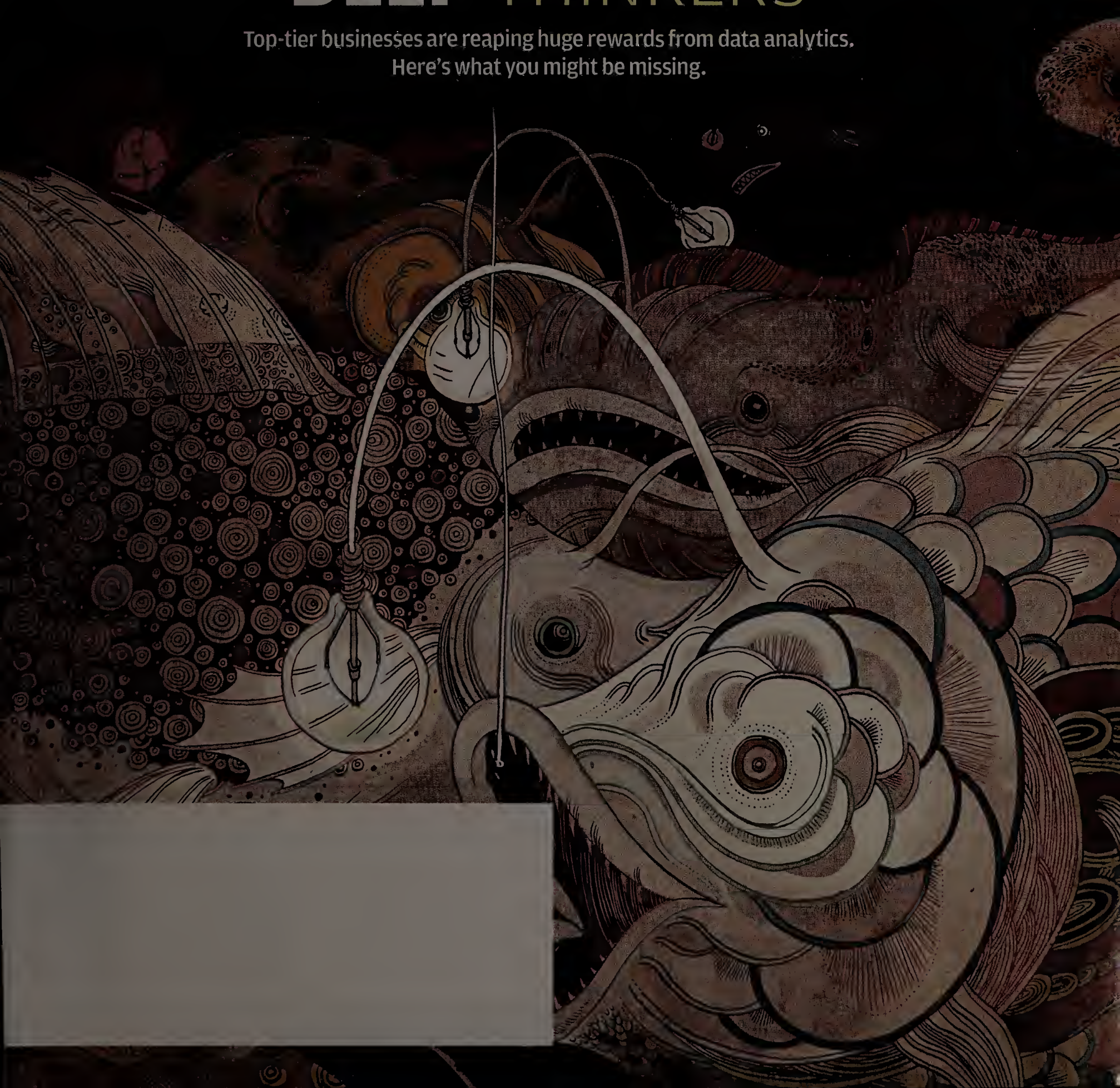
DEEP THINKERS

Top-tier businesses are reaping huge rewards from data analytics. Here's what you might be missing.



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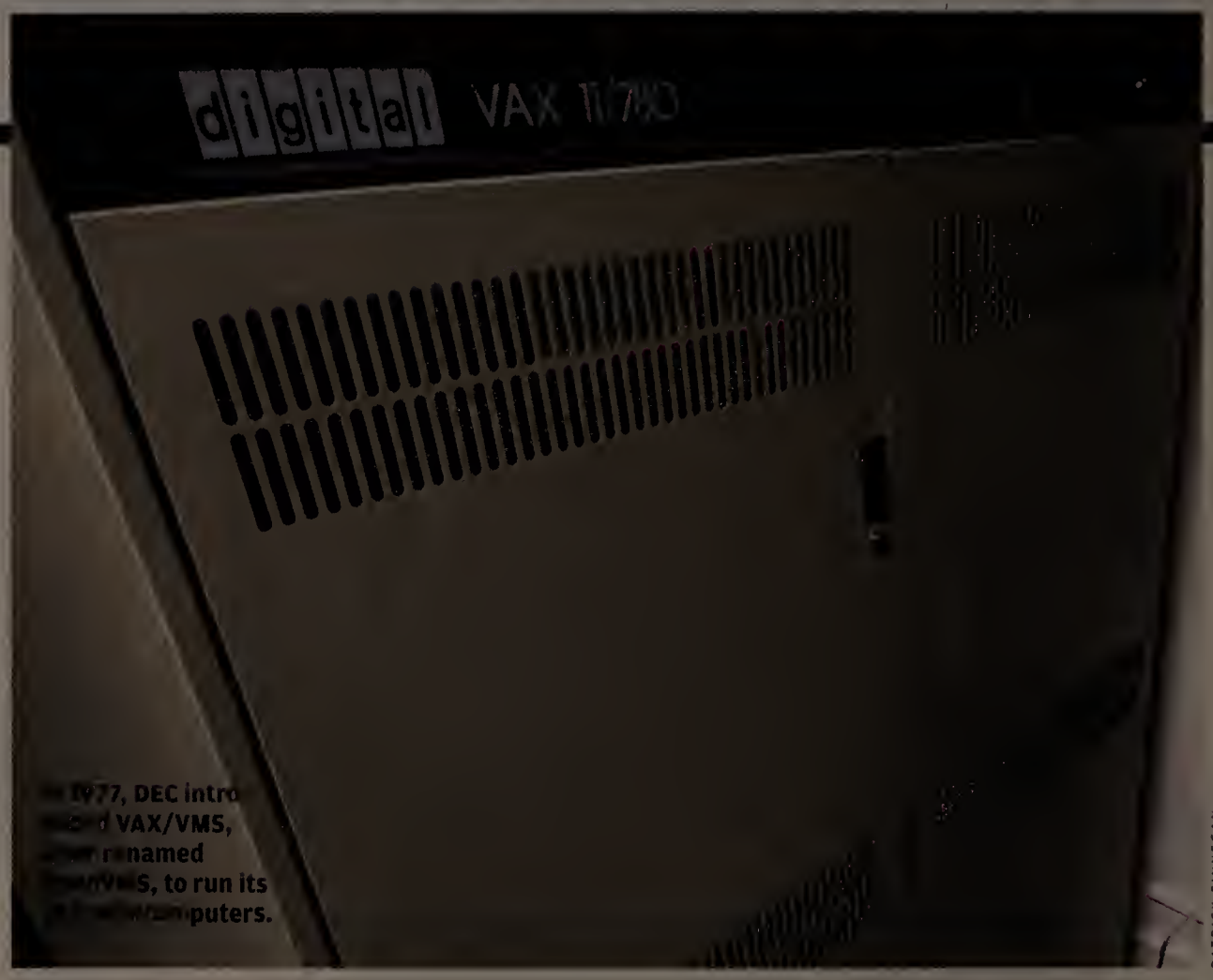

In 1977, DEC introduced VAX/VMS, later renamed OpenVMS, to run its minicomputers.

PATRICK FINNEGAN

OPERATING SYSTEMS

HP to Close the Book on OpenVMS in 2020

HEWLETT-PACKARD PLANS to stop supporting the venerable operating system OpenVMS in 2020.

Long valued for its reliability and renowned for breakthrough features, OpenVMS came into being in October 1977, when Digital Equipment Corp. started using the software, then known as VAX/VMS, to run its storied VAX minicomputers. The operating system is now part of HP's product lineup because DEC was acquired by Compaq in 1998, and HP purchased Compaq in 2002.

HP said it has about 2,500 unique customers running OpenVMS. But that only includes users with whom HP has a relationship. Others either support the 36-year-old operating system themselves or use third parties to keep it in shape.

The company said it will support OpenVMS on its Integrity i2 servers through the end of 2020, but that date isn't carved in stone.

HP will assess customer needs and could push the deadline back, said Lorraine Bartlett, vice president of marketing strategy and operations for the vendor's Business Critical Systems unit.

The company will continue to sell OpenVMS on Itanium platforms running the Tukwila chip, but not on the newer Poulson chip.

Users value OpenVMS for its security, reliability and clustering capabilities.

However, "a slow but definite" migration away from OpenVMS has begun, said consultant Stephen De Dalto, explaining that IT professionals have to justify their use of the operating system to higher-ups who say, "Move to Linux or Windows or Unix" without knowing what such moves would involve.

– Patrick Thibodeau

AUTOMATION

20,000 Robots Are on the Job in Foxconn Factories

Hoping to save money on labor, China's Foxconn Technology Group could also be ushering in a new era of manufacturing as it sets its sites on putting 1 million robots to work.

The world's largest contract electronics maker already has 20,000 robotic machines on the job in its factories, and it's on track to hit its goal of creating a "million-robot army," CEO Terry Gou said recently.

With wages on the rise in China, robots will help Foxconn save money, Gou said at the company's annual shareholder's meeting in Taipei. "We have over 1 million workers," he said. "In the future, we will add 1 million robotic workers" and the humans will become technicians and engineers.

Foxconn has spent three years creating robots, Gou said, but it will need more time to fully develop the technology, which will be used specifically for assembling devices such as mobile phones.

Robots have long been used to build cars and big electronic products. But people are still the best choice for assembling smaller gadgets, experts said.

Gou also said that Foxconn hopes to expand its U.S. manufacturing operations, if economic conditions allow. The company currently employs thousands of people in Indianapolis and Houston, he said.

– MICHAEL KAN, IDG NEWS SERVICE

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BETWEEN THE LINES
By John Klossner

TABLETS

Dual-OS Hybrids Create Challenges for IT

SAMSUNG'S UPCOMING ATIV Q convertible tablet is versatile: The 13.3-in. device runs two operating systems, Windows 8 and Android, and it can unfold to function as a laptop with a physical qwerty keyboard. But while that versatility may appeal to some users, it could confuse others, and it could create support and security headaches for IT shops.

Of course, that's assuming that the ATIV Q, announced late last month in London, is able to gain traction in the market when it finally goes on sale in the U.S.

Dual-boot devices, like the Lenovo IdeaPad U1, haven't sold well, largely because they didn't shift smoothly from OS to OS, said Rob Enderle, an analyst at Enderle Group. Announced in 2010, the IdeaPad U1 ran both Android and Windows 7, but Lenovo no longer sells it.

The ATIV Q is designed to switch instantly from Windows to Android, and that could prove to be a selling point.

But Enderle and other analysts said IT shops will worry about Android security, even with Samsung's Knox security approach, announced in February. "Enterprises are really nervous about Android because it has become such a huge malware problem," Enderle said. But that could change "if you can assure that the Android side of the ATIV Q is disabled while inside of the company's firewall."

Patrick Moorhead, an analyst at Moor Insights & Strategy, disagreed. "Enterprises could essentially double their ROI by taking what they did on phones and moving that over to tablets," he said, though he did acknowledge that it's still unknown whether Knox will be effective.

Forrester Research analyst G.P. Gownder said managing both operating systems in the ATIV Q "could be quite a challenge."

Analysts agreed that, its versatility aside, the ATIV Q will appeal to some users because of its super-high 3200-x-1800-pixel resolution, the highest of any device with a 13.3-in. screen.

– Matt Hamblen

Micro Burst

Tokyo-based SoftBank plans to invest

$16 billion

in capital improvements for Sprint-Nextel over the next two years.

CORRECTION

Updates to Best Places to Work in IT 2013

Due to a data-sorting error, we misreported certain rankings by organization size in the 2013 Best Places to Work in IT special report published in our June 17 issue. The listing for top 10 small organizations (those with fewer than 2,500 employees) was correct as printed. Here are the corrected top 10 lists for midsize and large organizations:

Top 10 Midsize Organizations
(2,500 to 9,999 employees)

1. Quicken Loans (Overall rank: 1)
2. Transocean (7)
3. Jet Propulsion Laboratory (16)
4. Applied Materials (17)
5. SAS Institute (24)
6. Principal Financial Group (27)
7. Cancer Treatment Centers of America (30)
8. University of Notre Dame (35)
9. Jack Henry & Associates (39)
10. Altria Client Services (41)

Top 10 Large Organizations
(10,000 or more employees)

1. USAA (Overall rank: 2)
2. Sharp HealthCare (6)
3. Qualcomm (8)
4. Genentech (9)
5. PricewaterhouseCoopers (10)
6. General Mills (12)
7. Erickson Living (13)
8. Verizon Wireless (15)
9. CSX (19)
10. Lehigh Valley Health Network (20)

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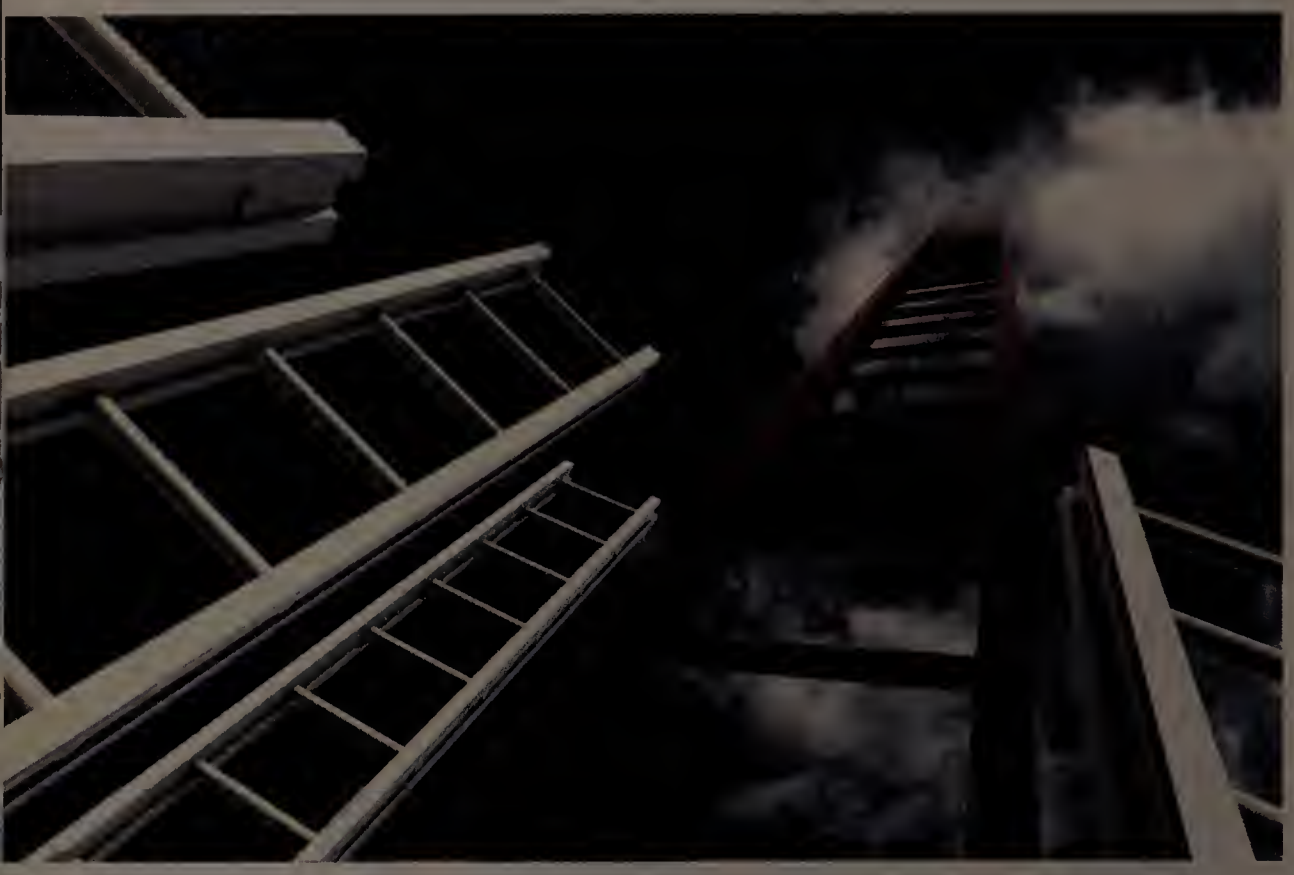

Oracle Joins Rivals To Advance Cloud

Ending a bitter feud, the database vendor enters into a cloud-centric deal with Salesforce.com, and announces similar agreements with Microsoft and NetSuite. By Chris Kanaracus and Patrick Thibodeau

LARRY ELLISON AND MARC BENIOFF, the CEOs of Oracle and Salesforce.com, respectively, apparently ended a long-standing and sometimes bitter public rivalry when they recently agreed to a nine-year deal under which their companies will integrate their technologies.

Announced last month, the agreement calls for Salesforce.com, long a user of Oracle's database, to standardize on Oracle's Linux operating system distribution, Java middleware and Exadata server platform, and use Oracle's Fusion human capital management (HCM) services and cloud-based financial software. Oracle will integrate Salesforce.com's software with those applications.

The key question now: Who gains the most — the Oracle and Salesforce.com marketing engines, or customers?

According to Ellison, it's the customers. The two companies will work closely to improve security and standardize links and thereby speed deployment, ensure the quality of the customer's integration and reduce downtime, he argued in a conference call with reporters and analysts.

The pre-integration work could cut deployment costs in half, Ellison said.

Gartner analyst Michael Maoz disagreed, saying the integration of Oracle and Salesforce.com products will help only a small percentage of users. He estimated that just 4% to 6% of the joint installed customer base, large users mostly, could benefit. "The vast majority of Salesforce.com customers aren't doing much integration to begin with," he said.

Left unanswered is when the packaged integrated offerings will be available, and what the new working relationship will mean for Oracle's own customer relationship management products. In the past, Ellison has said many Salesforce.com customers have "chucked" Salesforce.com CRM software in favor of Oracle's.

In the conference call, Ellison told reporters that "Salesforce.com and Oracle have some overlapping products, but there are far more opportunities to work together than to compete." His tone was a departure from the days when he said Salesforce.com's platform was difficult for customers to migrate away from and described it as a "roach motel" where "you can check in but you can't check out."

The Salesforce.com deal came the same week Oracle signed similar agreements with Microsoft and NetSuite.

Under the former deal, Oracle technology — including the database, Java and other products — will play a more prominent role in Microsoft's Azure cloud service. Oracle will also support Microsoft's Hyper-V virtualization software.

Oracle and Microsoft have worked amicably on initiatives in the past, but "in the world of cloud computing that kind of behind-the-scenes collaboration is not enough," Microsoft CEO Steve Ballmer said during a press conference. "People wanted more from us. People wanted more from Oracle."

Oracle also agreed to integrate its own HCM cloud service with NetSuite's cloud-based ERP services.

Michael Fauscette, an analyst at IDC, said that agreement is a "really good thing" for NetSuite customers, in particular, because it gives them an Oracle software option.

Underscoring all the agreements is the recognition that there's a need for more support for and stronger integration of products used in cloud platforms, analysts said.

"[It's] a recognition on Oracle's part that cloud-based software delivery is becoming a marketplace reality, and it needs to be actively engaged if it wants to gain the benefits of that market," said Charles King, an analyst at Pund-IT.

Kanaracus *is a reporter for the IDG News Service.*

> "People wanted more from us. People **wanted more** from Oracle."

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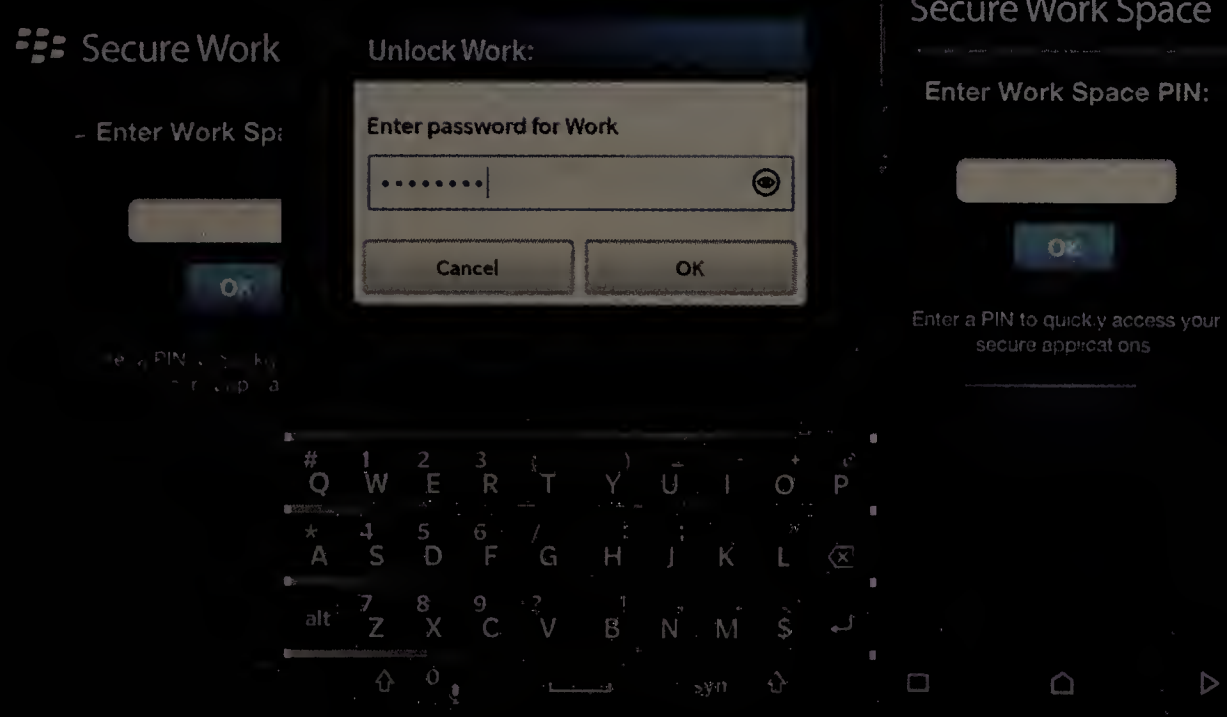

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Steam rising from a vent in Manhattan is eerily illuminated by the headlights of oncoming cars during a blackout following Hurricane Sandy.

An IT Bucket Brigade Relives Hurricane Sandy

A new film recounts how a data center's customers and employees worked tirelessly to keep the facility running after last fall's big storm. By Patrick Thibodeau

THE IMPROBABLE TALE of a diesel-fuel bucket brigade that kept a flooded Manhattan data center running in the wake of Hurricane Sandy is not retold with fondness by those who were involved, even if they do share a sense of pride in their achievements and can now see humor in the schemes they devised as they desperately tried to respond to the storm that struck the East Coast in October 2012.

The participants recall the stench of diesel in dark stairwells, and the physical toll of carrying buckets of fuel up 17 flights of stairs so they could pour it into a rooftop generator's fuel tank after floodwaters shut down basement pumps. They also remember sleeping on floors, going without showers, and enduring the stress of knowing that failure could put the data center operator out of business.

The story of the people who helped save Peer 1 Hosting's data center at 75 Broad St. is told in a documentary-style film that Peer 1 produced and first showed to a group of its customers and employees last month.

The thought of carrying fuel to the roof "seemed like a ridiculous idea," said Michael Pryor, president of Fog Creek Software, a major user of the data center and a member of the bucket brigade. "It didn't seem feasible."

His initial idea was to pump fuel using equipment from a fish tank in his nearby office. When that suggestion was recounted in the film, the audience — and Pryor himself — responded with healthy laughter.

But the fact that such ideas were on the table reveals the sense of urgency facing Peer 1 workers and customers as they struggled to find ways to make sure that a rooftop generator that burned 40 gallons of fuel an hour could keep the data center running.

Data center employee Jeffery Burns recalled hearing a cascade of floodwaters in the elevator shaft that eventually swamped the basement and disabled the fuel pumps.

"Everybody in Manhattan had the same problem: how to relocate infrastructure that for 50 years had safely lived in basements," said Michael Mazzei, Peer 1's data center manager.

Despite the hardships caused by Hurricane Sandy, data centers won't be leaving Manhattan, one of the most networked places in the world, anytime soon (see "Data Centers Under Water," page 32). Indeed, the building that houses Peer 1's systems is the former headquarters of International Telephone & Telegraph. It has multiple network connections that let Peer 1 offer users quick access and low latency. It's also just a short walk from the waterfront.

For Fog Creek, and likely many other businesses in the area, the most significant impact of Hurricane Sandy may be its decision to devise stronger backup plans.

In the months since the storm, the company has improved its data replication capabilities and has begun developing an ability to switch operations to another facility in an emergency. It also shifted one tool to Amazon's cloud service, but that move had been planned prior to the storm.

Sandy made Fog Creek officials painfully aware of the fact that they hadn't paid enough attention to the likelihood that something bad could happen — something like a massive storm. Said Pryor: "It did kick us in the butt and get us to fix a lot of things that were broken." ◆

> "Everybody in Manhattan had the same problem: how to relocate infrastructure that for **50 years** had lived safely in basements."

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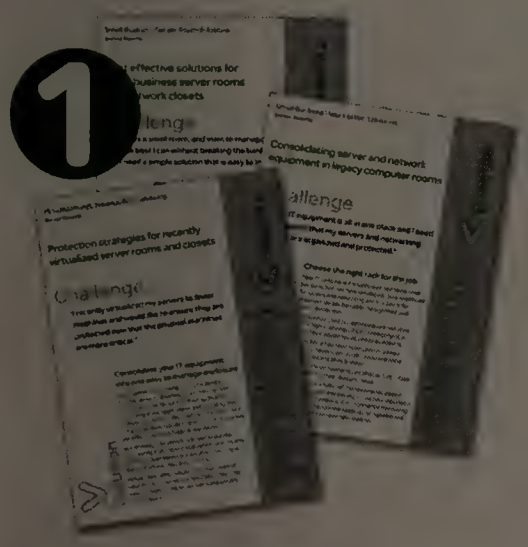

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THE Grill

Kathy Moore

This CIO is helping to launch a massive health information exchange.

Family: Married, with four grown children

What accomplishment are you the most proud of? "I feel like I've helped a lot of others with their careers, and I feel good about that."

What's the best advice you've ever given to anyone? "Don't take it personally, it's just business."

And what's the best advice you've ever received? "'Never go down with an issue.' I got that from a college professor who used to be a state official who went down with an issue."

Hobbies: Gardening

THE WEST VIRGINIA HEALTH INFORMATION NETWORK *was created by the state of West Virginia and charged with building a secure electronic health information system so providers could access and exchange patient data. The goal is to improve the quality of patient information and thereby enable providers to more quickly offer better care at lower costs. Among those leading the effort is Kathy Moore, CIO of the network. Moore is now working with hospitals and other healthcare providers in the state to get them connected to the exchange. "The exchange is now up and live, and we're focused on rollout and bringing on as many as possible," says Moore, a former deputy CTO for the state of West Virginia. Here she shares her thoughts on leading this huge IT project.*

How do healthcare providers need to prepare for the new network? Technically [the electronic health records] need to be in one place, and organizationally [the providers] need to be ready, too. That's a big part of the onboarding process. You can connect up technically, but if you don't know how to use it, what data you want to contribute, how your employees are going to implement that, then you're not really ready.

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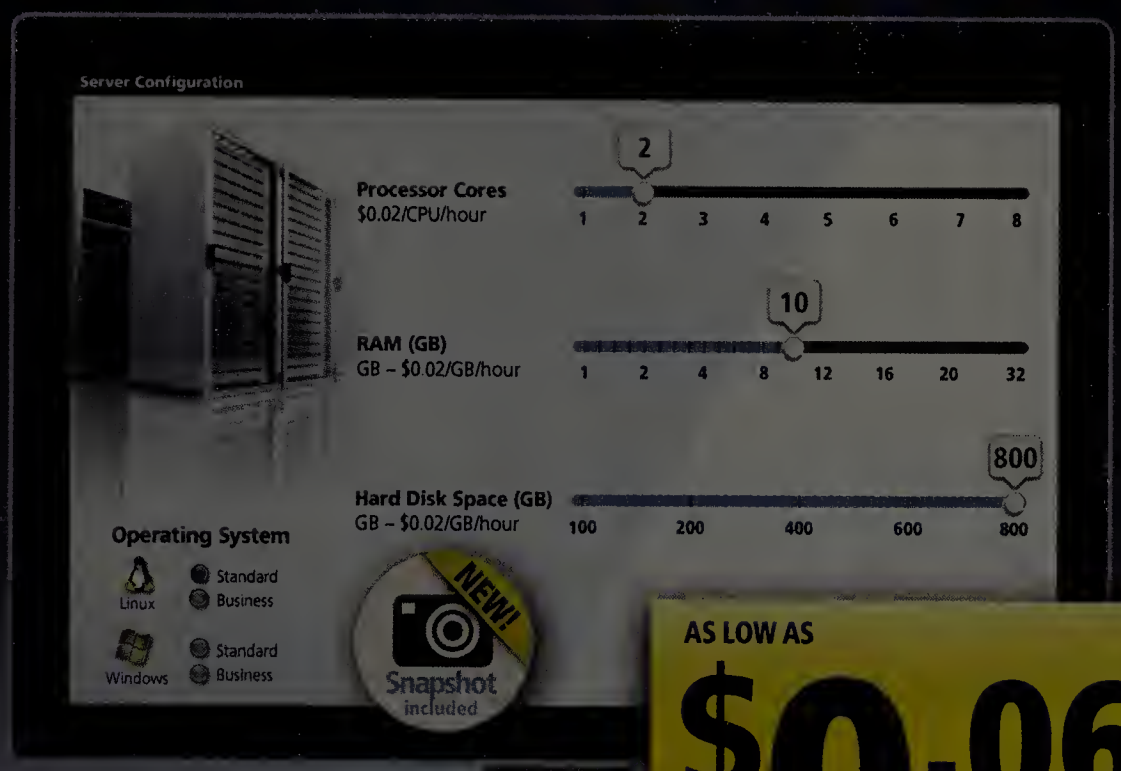

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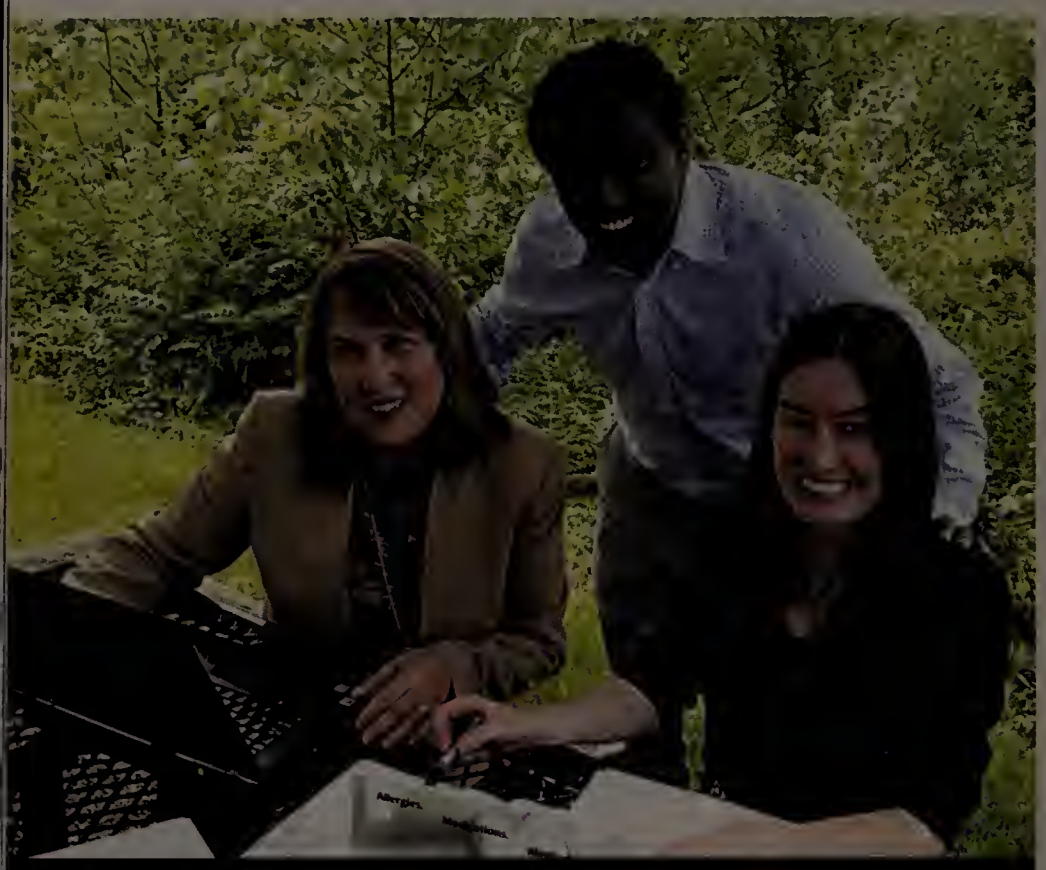

Kathy Moore (left) at work with Muluken Aseffa, a graduate intern from Marshall University, and Amber Nary, business development manager for the West Virginia Health Information Network.

> It's amazing to me to think about **how much of a difference** [the health information exchange] can make in the future.

What are the biggest challenges in building this system? Orchestrating everything. There are just so many players and so many factors. For example, for a single hospital to onboard, you've got a governance team, a technology team, a training team, patient notice, and support. Then there's our staff, the vendor, their staff, their policies, our polices, training and ongoing support. So getting all those moving parts working is a challenge. And there are so many different vendors selling [electronic health record systems] to doctors, so each one is a different connection.

Is the technology side a bigger challenge than the other parts of the project? I think they're equally impactful because it really is any one of those pieces that can cause the entire thing to not work well or not get adopted. On the technology side, everybody is hitting the market with [application options] at the same time without necessarily seeing what's ahead with some of the future requirements. A lot of people are offering the same services, so you have to be careful not to step on each other's toes in what you're trying to provide to the customer. We don't intend to, but sometimes it appears that way, because some of the larger vendors are offering their own private [exchanges]. What they end up doing is connecting anyone who has their product together.

Does that mean you have to sell your organization and its mission? Sometimes I feel like we get put in that position. It's more negotiating what makes sense to do: participating in this state exchange versus participating with the vendor. It looks sometimes to the customer like the same thing, and we have to sort it all out for them.

Do healthcare providers have to pay to be part of your group? Eventually they will. We will be developing our sustainability model. We have funding to last us approximately four more years, and our sustainability requirements aren't great because we're not a profit-making organization. But it will be one of our future challenges.

What are other challenges? Short term is developing that sustainability model, driving the value and managing the initiatives with limited resources. But longer term, it is consumer engagement. We have a patient portal, so there will be a point where patients could access their records, regardless of who contributed that information.

Is the patient portal active? It is active, but we haven't deployed it. We have a pilot coming up in the next few months. We expect that to be managed by the providers themselves, for them to give patients access. But we're hosting the application, and we have to develop the policies around the use of the patient portal and how the providers can provision and manage within that portal. Then patients would be able to access and see and download any information in there to their own personal health records.

What are the biggest opportunities around this initiative? It is really for improving access to information to healthcare providers so they can make decisions sooner with the right information, and they can improve outcomes and lower costs. To me, it's really hitting home because I'm having this type of experience. My father has [healthcare providers] coming to the home and they're asking the same questions. But if they had the information through an exchange, they'd have those answers before they walk through the door. It's almost like they're working with blindfolds on. It's amazing to me to think about how much of a difference it can make in the future.

Are you seeing that difference now? We are. The stories are starting to come through. Yesterday we worked with a public health [official who was] able to access and validate information about a disease. It was a public health mandatory reportable disease. We were trying to see if the system had information valuable to her. In three minutes, she found information that before would have taken her three days to find.

— *Interview by* Computerworld *contributing writer* **Mary K. Pratt** *(marykpratt@verizon.net)*

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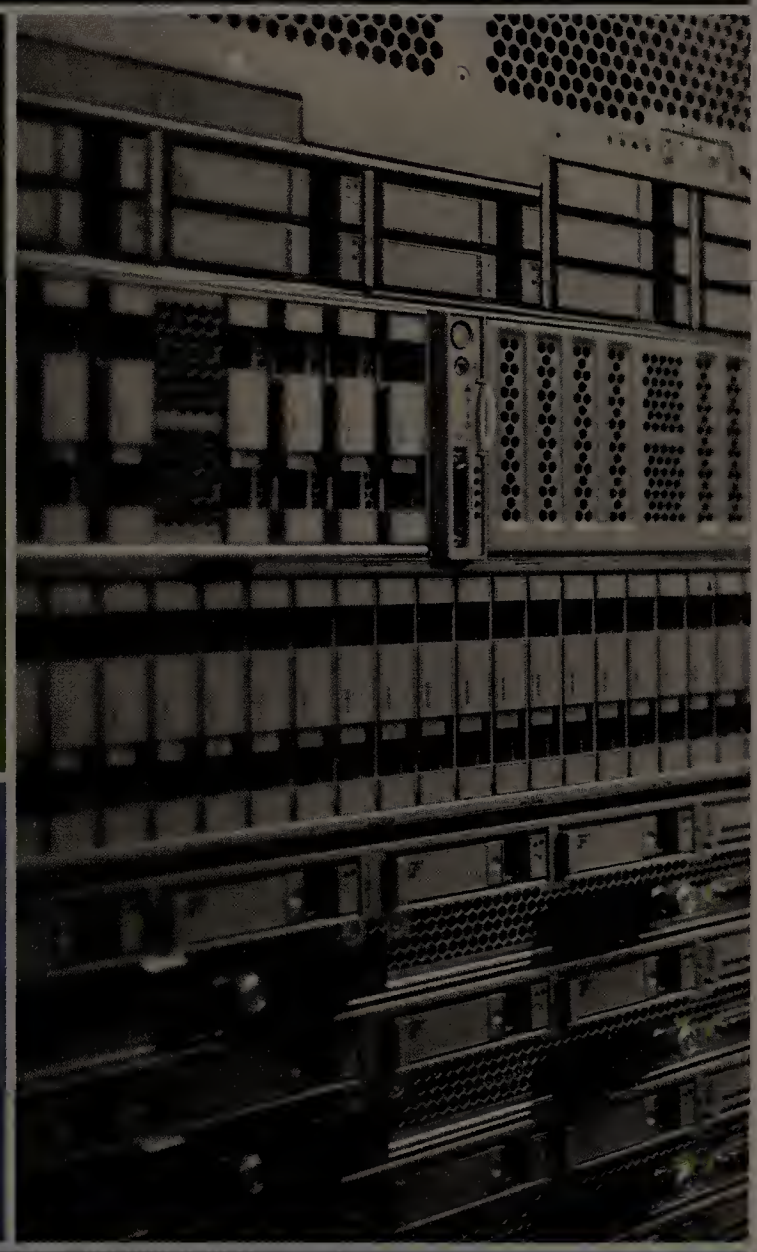

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OPINION

PRESTON GRALLA

Microsoft Has Derailed for Lack of an Engineer in Chief

PEOPLE GIVE PLENTY OF REASONS for Microsoft's fall from the top of the tech heap. Two of the more common explanations are internal turf wars and the inevitable decline of a near monopoly that got fat and happy.

> The tech companies that have surged since Ballmer took over are headed by engineers.

But I think there's something much simpler at work: It's been years since Microsoft has been run by an engineer. Bill Gates stopped working full time for Microsoft in 2006, and since then the company has been run by non-engineer Steve Ballmer. Before joining Microsoft, Ballmer worked as an assistant product manager for consumer products giant Procter & Gamble and spent a year in the MBA program at Stanford. That's not the set of job skills and background the CEO of a tech company needs today.

Take a look at the tech companies that have surged since Ballmer took over from Gates. Google is headed by engineers. True, people thought that founders Sergey Brin and Larry Page needed some adult supervision. But who stepped in to run the place? Eric Schmidt, a former director of software engineering at Sun.

Facebook is run by an engineer. Apple founders Steve Jobs and Steve Wozniak were engineers, and though Jobs couldn't rival Wozniak's prowess, he could code and build hardware, and he lived for overseeing product design. Tim Cook, the current CEO, has a degree in industrial engineering.

Why does all that matter?

Because in tech, the product rules. Products trump marketing, strategy and even smart management. What drives technology isn't dividing up an existing market. It's creating entirely new markets by developing products that people crave.

Google succeeded for a very simple reason: At launch, it was by far the best search engine on the planet. Facebook became a success because it was far more useful and "sticky" than any other social media service. As for Apple, its history suggests that, while engineers can't always save a struggling tech company, a marketer has almost no chance. When Jobs was forced out in the mid-1980s, the CEO was John Sculley, an MBA who had been, among other things, a vice president of marketing at Pepsi. Sculley's ouster was preceded by a misstep on the tech side — moving the Mac to the PowerPC chip. Although he was followed by two tech-oriented CEOs, it wasn't until Jobs returned that Apple took off again. The spate of new products Jobs developed was remarkable and spurred Apple's meteoric rise.

Engineers succeed as tech leaders because they live and breathe products and care about them in visceral ways that managers — even very good managers — don't. For people like Jobs, Mark Zuckerberg, Brin and Page, building products is a calling, not a job.

Not so for Steve Ballmer. Listen to him talk about products. He's robotic, his enthusiasm is artificial, and his message never strays from whatever marketing campaign has been designed for him. During the launch and early days of Windows Phone 7, he incessantly repeated that the new phone operating system would "delight" users. It was by far one of the most inauthentic, marketing-driven performances I have ever seen.

Jobs, Brin, Page and Zuckerberg never needed to gin up their enthusiasm for what they created. If Microsoft wants to get its mojo back, it should be looking for a leader who's similar to those four: an engineer who loves tech products, not someone who just sells them. ◆

Preston Gralla is a *Computerworld.com* contributing editor and the author of more than 35 books, including *How the Internet Works* (Que, 2006).

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These three top-tier businesses are reaping huge rewards from data analytics. Here's what your company might be missing out on.

BY JULIA KING

DEEP THINKERS

SIMPLY PUT, DATA IS THE LIFEBLOOD AT EXPRESS SCRIPTS, a $44 billion pharmacy benefits management company based in St. Louis.

The Fortune 100 company processes close to 1.5 billion prescriptions for some 300 million consumers per year, all the while analyzing the wealth of information that accompanies each order.

"As we track a prescription through data entry and the pharmacy process and into the fulfillment system, we're tracking all sorts of information that gets fed to an analytics team that is focused on process improvement," says CTO Jim Lammers. Internally, it's how the company speeds delivery and cuts errors, he says.

VICTO NGAI ILLUSTRATION

But Express Scripts also processes more than 1 billion pharmacy insurance claims annually, and they represent a gold mine of information that could help cut healthcare costs and address the multibillion-dollar healthcare problem created by people who don't take their medications as prescribed, says Lammers.

Computers, mobile phones, tablet devices, sensors, tweets, texts and posts to social networks, not to mention run-of-the-mill retail and registration transactions online, are all generating potentially valuable data. A lot of data. By 2020, IDC estimates that the number of business-to-business and business-to-consumer online transactions will reach 450 billion per day. We took a look at three organizations that are ahead of the curve in generating big business value from big data and analytics technology. At the top of their lists of lessons learned: A deeply-rooted culture of analytics and a relentless focus on cost efficiency and process improvement are invaluable.

THE WIN: Lower Healthcare Costs

At Express Scripts, claims data can show whether patients are filling their prescriptions in the most cost-effective way, which is frequently by mail order. If they aren't, Express Scripts can intercede by providing the patient with additional cost information and offer to switch delivery fulfillment methods for them with a minimum of hassle.

"If they're taking a maintenance medication for high cholesterol and we know they've been taking it but they've been taking it from a retail pharmacy, we know if they move to a mail order, they can save," Lammers says. "We'll do proactive emails and drive the patient to our website and use specific messaging to get them to make [a mail order] decision."

What it boils down to is "doing the data analysis, creating the interaction and getting out the right message so that the patient can make a different choice," Lammers explains. "One of the key tenets is that if we offer people the right choice, they'll take the right path."

It sounds easy, but behind the seemingly effortless redirection is a massive amount of technology, not to mention a strict culture of analytics that permeates virtually all of Express Scripts' operations.

One of the company's largest IT investments has been in IBM's master data management software, which is critical to creating a single record that connects all of a customer's actions, regardless of whether a transaction is made via email, on the Web, by phone or in person at a retail pharmacy.

"One of the biggest challenges is linking all information together across all these different sources," says Lammers. "We've made very heavy investments in master data management. We invested early on and we've been through two or three iterations."

Express Scripts also created what Lammers calls a federated analytics model that includes a business analytics team embedded in each key functional operation, such as supply chain, sales and finance. A single data warehouse and centralized data governance are two other keys to the company's analytics success, he says. "With a centralized core, everyone is looking at the same data," Lammers notes.

We're tracking all sorts of information that gets fed to an analytics team that is focused on process improvement.

JIM LAMMERS, CTO, EXPRESS SCRIPTS

With a proven data governance model and a data management foundation in place, Express Scripts recently expanded into predictive analytics, introducing an application called Screen Rx that's designed to reduce the problem of patient non-adherence to prescriptions for chronic conditions such as diabetes and high cholesterol. At a cost of more than $317 billion annually, non-adherence is the most expensive healthcare-related problem in the U.S., according to Express Scripts.

For example, skipping doses of a prescribed cholesterol medication might trigger heart attacks for some patients. Using predictive modeling based on 400 factors, such as a patient's location, family situation and the number of medications involved, Express Scripts can now identify, and proactively intervene with, patients who are likely to skip doses. Interventions might include a timely reminder to the patient to take his medication or a referral to a patient assistance program to help him pay for his medications. A third option is a referral to a clinical pharmacist who can assist with questions or concerns about a drug's side effects.

"This is really one of the key things we've been building to — to change behavior," says Lammers. He adds that striving to

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"It starts with believing that you can change outcomes." – **KIM STEVENSON,** CIO, INTEL

foster healthy behaviors in patients is especially important in light of impending healthcare reform as millions of people gain access to consistent healthcare for the first time.

"We have to train them to take care of themselves," he says. "When we can put Screen Rx into a population that hasn't had consistent access to healthcare, we can get them to get the right stuff right away."

THE WIN: Fuel Savings and Better Driver Safety

Transportation and logistics giant UPS, which has annual revenue of $54 billion, invests roughly $1 billion per year in IT, and a very hefty portion of that is devoted to data analytics, according to Juan Perez, vice president of information services. The goal — for now — is to improve business processes, cut costs and increase efficiency.

The effort has been a success. By analyzing a continuous stream of sensor data from its thousands of delivery trucks, the global company has eliminated 5.3 million miles from its routes, reduced engine idling time by almost 10 million minutes, saved 650,000 gallons of fuel and reduced its carbon emissions by more than 6,500 metric tons.

At the heart of these eye-popping metrics is ORION, which stands for On-Road Integrated Optimization and Navigation, a data-intensive system that lays out the most efficient routes for individual drivers to deliver their loads via a series of complex algorithms. Additionally, the system taps into the mountain of sensor data to predict when a truck part might fail so that preventive maintenance can be scheduled and completed.

ORION also lets UPS managers peer into the habits of individual drivers, pinpointing, for example, the number of times a driver backs up a truck or makes a U-turn. This information can be used to identify drivers who need additional training.

"We have sensors that capture information about the vehicle and the driver's behaviors. We marry that information to delivery and acquisition information, and we can get a complete picture of how a driver is completing his work, day in and day out," Perez says. "That has incredible consequences for the way we manage the business across the board."

Now, the company's appetite for data is extending outward. Its goal is to get closer — much closer — to its millions of customers with another analytics-intensive service called UPS My Choice, which lets people set individual preferences for how they interact with the company.

Customers using the service can, among other things, give specific instructions about how and precisely where to deliver their packages to specific addresses, reroute packages if they change locations, and sign up to receive status alerts.

"What we've done is take a new approach to managing personal supply chains. Having that level of connectivity with our customers is going to change our business now and in the years to come. The integration with consumers is what is enabling revenue growth," says Perez. In the first year UPS My Choice was available, more than 2 million customers signed up for the service, and more than 25 million packages were delivered under its auspices.

Data about customers' delivery preferences helps UPS to continue to refine its internal processes in response to those preferences "so we can build a one-to-one experience," Perez says.

But even more critical is the insight that the data provides into what new products and services to offer.

"All of the [tracking and delivery] notifications we provide and how customers respond to notifications tell us what they want so we can create the products and services they want. It's a lot of data to define new products and services."

The next step, as Perez sees it, is to tie everything together and create a graphic picture of UPS's various big data systems so the company can uncover new uses for the data — and thereby derive more business value from it.

"It starts with process improvements, but once you start tying all of this together, it can mean very big changes in the business," Perez says. "That's what we're getting at."

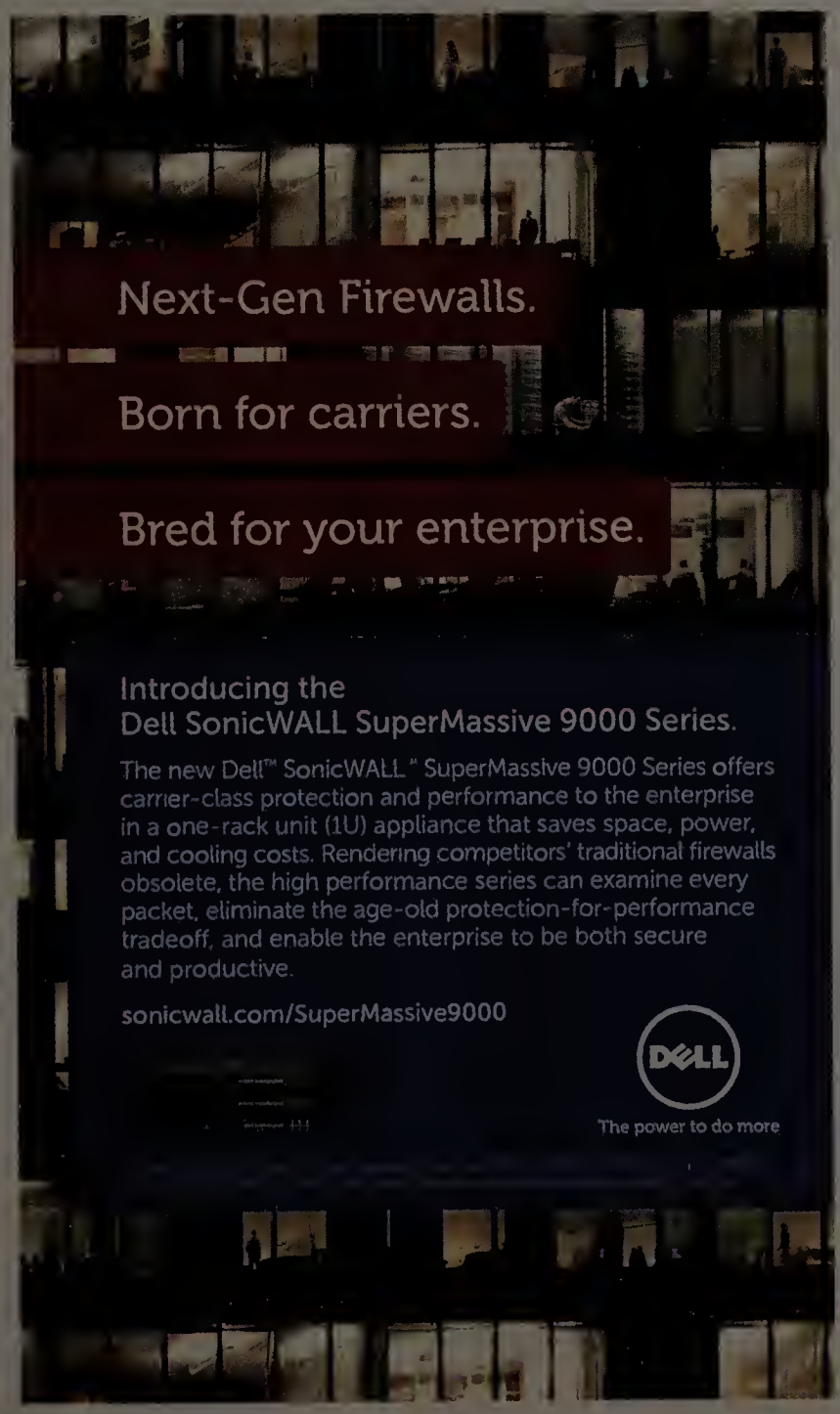
THE WIN: Millions in Added Sales

Traditional business intelligence is alive and well at Intel, but big data mining and predictive analytics are the forces driving design and manufacturing efficiencies, and uncovering new revenue sources that added up to tens of millions of dollars in 2012 alone.

"It starts with believing that you can change outcomes," says CIO Kim Stevenson of the chip manufacturer's massive success with analytics. That, she says, requires less time spent on historical questions, which is the purview of traditional BI, and more focus on the future, which is what predictive analytics is all about.

Predicting the future at $53 billion Intel requires analyzing massive amounts of data to discern patterns and then applying predictive algorithms to solve high-value business problems.

In 2012, for example, Intel IT created a new reseller sales tool that worked to increase the chip maker's revenue by enabling its sales team to identify, then strategically focus on, larger-volume resellers. The new software engine mines large sets of internal and external data, then applies a predictive algorithm to pinpoint the most promising resellers. So far, it has helped identify three times as many high-potential resellers in the Asia-Pacific region as manual methods typically would have uncovered, according to Stevenson. That translates to about $20 million in potential new and incremental sales. More gains are expected as the tools are rolled out to other geographies.



On the manufacturing front, Intel is using a predictive analytics tool to reduce microprocessor testing time. The company saved about $3 million in testing during a proof-of-concept period. By 2014, as the tool is implemented more widely, Stevenson expects it to rack up another $30 million in savings companywide.

Intel's analytics success has been fast-tracked, to say the least. The key, Stevenson says, is tackling big-money problems with relatively small and swift-acting teams.

"To get the business to focus on the future and ask better questions that would lead to better outcomes, we knew we would have to do things quickly," she explains. "We were coming out of a traditional BI environment where solving master data is the unsolvable problem. People work on it forever and the business doesn't necessarily see the value."

So Stevenson came up with the "six months and $10 million" rule. "A $10 million problem solved in six months is important. Any general manager would say they'd invest six months if we could save them $10 million," she says. (At Intel, business managers must support and fund IT projects.)

Stevenson recruited five-person teams made up of a business expert, a statistician, a predictive modeler, a machine learning expert and a data scientist. "Each person on the team had a slightly different perspective on the problem we were trying to solve. Doing it in six months was our way of earning the right to prove the capability was there to really change the way we do things," she says.

In addition to the projects that reduced testing time and pinpointed lucrative resellers, 13 other analytics projects have been completed using that approach. So Stevenson has upped the ante by finding $100 million problems and challenging teams to solve them.

"When you have a track record, you can ratchet up," she says. Other ongoing projects include a predictive engine for streamlining Intel's chip design and debugging process and another to predict new information security threats.

But Stevenson cautions enterprises not to underestimate the skills required for analytics initiatives and the time it may take to nurture those skills.

"When I think about our learning curve with Hadoop and some of the more advanced presentation layers that are very different from SAP or traditional BI, I'd emphasize that there is a learning curve there for technical skills that isn't insignificant," she warns.

Her other piece of advice: "Develop an appetite for experimentation," especially since analytics technology is still evolving. "The winners and losers on the tech side are not completely shaken out yet," she says. "Keep your aperture wide." ◆

Forget new (and better) technologies – email is as entrenched in the business world as it's ever been. Here's why we can't break free. BY HOWARD BALDWIN

Our Email Addiction

DON KILPATRICK ILLUSTRATION

ATOS CEO THIERRY BRETON caught a lot of flak last year when he announced he wanted his employees to give up email, but he may have been onto something.

Kids these days don't use email — digital market research company comScore found that use of Web-based email dropped 31% among 12- to 17-year-olds and 34% among 18- to 24-year-olds in the period between December 2010 and December 2011.

And consumers in general are also off email. The Radicati Group, which tracks use of email and other messaging media, projects the number of consumer emails will decrease by 3% to 4% each year between 2012 and 2016 (see chart, below right).

Then again, there was a reason Breton came in for so much derision: Enterprise email isn't going anywhere. Or, more precisely, enterprise email usage isn't going anywhere but up. Radicati is projecting the number of business emails to increase by 13% every single year between now and 2016.

For businesspeople, that means more time scrolling through the inbox (not only on PCs and laptops but now on tablets and smartphones) clicking past newsletters, social media notifications and spam in search of the messages they truly need to do their jobs, and then later filing, archiving and retrieving those messages.

For IT, that means more complaints from users about storage limits being too low (especially when Google lets them keep everything), as well as worries about security, archiving, retention, e-discovery, deletion and syncing mail between mobile devices. And then there's the cost: In 2010, Gartner estimated that the various costs tied to email add up to $192 per user per year.

Why do we subject ourselves to this madness? Because for all its aggravations, email works. "It's still an efficient way of communicating, almost in real time," says Phil Bertolini, CIO of Michigan's Oakland County, who's responsible for 10,000 email boxes.

"It does what it's designed to do quite well, which is allow us to securely communicate on a one-to-one or one-to-few basis," says Rob Koplowitz, an analyst at Forrester Research.

Simply put, we may hate email, but we can't work without it. But CIOs and messaging experts agree that something must change that if enterprise email volume is going to boom the way Radicati's numbers indicate. Email is going to have to get more sophisticated and, at the same time, easier to use. And the people doing the using, who often make life harder for themselves, need to evolve, too.

Why We Love Email

We love email because it's useful and ubiquitous. It keeps us connected and updated without requiring sender and recipients to be online at the same time, thanks to its asynchronous nature. Everyone doing business today can reasonably be expected to have an email address, whereas only some people use alternative tools like chat, videoconferencing or SMS texting.

Beyond that, email creates a de facto audit trail with a record of who sent what to whom when. And, barring space limitations, that trail is readily available on one's computer.

The result of this success? "Nobody can live without it for more than two minutes," says Sara Radicati, president and CEO of The Radicati Group.

From Unix mail (b. 1972), IBM PROFS (b. 1981) and DEC All-In-1 (b. 1982) to email clients, integrated email (think Lotus Notes) and Web-based mail to today's cloud-based options, email has evolved because we have needed it.

Bertolini is a big fan of email — since the public sector is still heavily paper-based, email still counts as a big technological step forward. "We can chase new technologies, but I need something that's trusted and used by the masses. Even though there are people clamoring for newer ways to communicate, email is our main form of communication," he says.

Why We Hate Email

Unfortunately, email's positives — its utility and ubiquity — have become its negatives as well.

Consider this complaint: "It doesn't matter if the message comes from a spammer hawking Viagra, your wife asking you to pick up some wine, your boss telling the company that Monday is a holiday, or a client asking for a meeting at his office at 11 a.m. In today's inboxes, all email messages are equal," journalist Om Malik wrote *six years ago*, in 2007. If anything, the situation has only gotten worse.

The problem, says Koplowitz, is that "we use email for things it wasn't designed to do." Hooked on email, users default to it for scheduling, workflow planning, resource management, archiving, document management, project management and even knowledge management. Often, ideas that should be shared widely are locked up in an email chain among a narrow list of recipients. "The things it does poorly have become problematic," Koplowitz sums up.

Over the years, developers have tried to break through users' dependence on email with software that's more sophisticated and better suited to certain enterprise tasks — often with only limited success.

Knowledge management systems, touted in the 1990s as the next big thing, failed to catch on, while collaboration systems such as Lotus Notes and Microsoft SharePoint have been variously successful; the inclusion of Chatter into the Salesforce.com system serves specific needs of salespeople.

But typically these systems have failed to become as widespread as email because, while they offered a solution that may indeed have been superior to email, they did so only for a narrow population of users.

"There's a high correlation in the success of these tools when they're aligned with recognizable business value," says Koplowitz. Unfortunately, he adds, there's frequently an organizational mismatch. The tools that work for one department (e.g., sales) may not work for another (e.g., customer service).

Email's People Problem

Is the enterprise's email addiction rooted in technology or in user behavior? Both, analysts say. "Email is only as good as the person who organizes it," observes Sara Radicati, president and CEO of The Radicati Group, which tracks use of email and other messaging media.

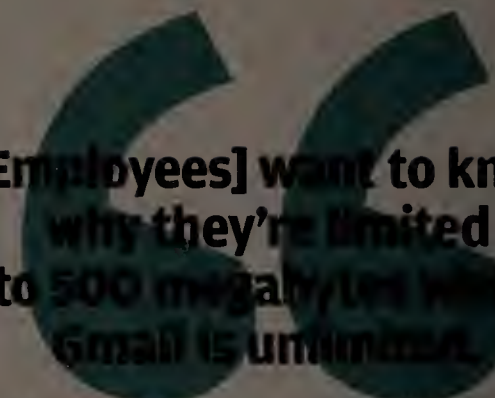
Over the years, enterprise email systems have added an ever-increasing number of sophisticated organizational tools, but "users still have to train the system, which is where it breaks down," Radicati explains. "Users forget how they set it up a certain way, and why. Somebody who is highly organized and structured will do well with these tools, and someone who is naturally chaotic will be chaotic."

Adam Glick, Microsoft's product manager for Exchange and Outlook, acknowledges that "you can change the tools, but you can't change the people." Citing one example of how the tools are changing, he notes that the current version of Office 2013 has an option that lets users ignore any email with a particular subject line if that thread has become irrelevant to the recipient. On a grander scale, Exchange and Outlook are becoming more of a communication hub, with greater integration of chat and unified communications, Glick says.

But all those advances will be meaningless if people don't take advantage of the new functionality — and IT must help them do that.

"IT needs to explain how and when to use these features," says Radicati, "and people need to learn to improve their efficiency."

— HOWARD BALDWIN



PETE KARDIASMENOS, SYSTEMS ARCHITECT, SBLI USA

And when a new communication tool like Yammer or Chatter does take hold throughout the enterprise, what happens? Users route their notifications to the one place they're most likely to see them first — the omnipresent email inbox.

IT's Email Burden

For IT, email is an ongoing headache. Niraj Jetly, CIO at Edenred USA, the Newton, Mass.-based U.S. division of a global developer of employee benefits and incentive solutions, cites a quartet of hassles: the sheer volume of messages; compliance and security concerns; the risks that arise when users access corporate email on their personal devices; and international routing problems.

"No one can support ever-increasing mailbox sizes," he says. "At the same time, we have to ensure the safety and security of sensitive data being transmitted. We have to ensure the availability of emails archived by users on their laptops or desktops."

As a divisional CIO within a multinational organization, Jetly also says getting email from continent to continent is a challenge. "It gets very tricky when different government [regulations] and private-sector contracts restrict email routing," he explains. For instance, certain Payment Card Industry Data Security Standard mandates require that emails originating in the U.S. stay in the U.S.

The bring-your-own-device trend also worries him. "If an organization needs encrypted email but also supports BYOD, supporting access to corporate email on personal devices becomes a never-ending challenge," Jetly says. "And if a user loses a personal device, who has liability for the loss of data?"

Pete Kardiasmenos, a systems architect at SBLI USA, manages the New York-based insurance company's Exchange servers and gets involved with "anything relating to email." His biggest issue: users turning to free external email systems, such as Yahoo Mail and Gmail, to circumvent corporate storage limits.

"They don't have bad intentions. They want to know why they're limited to 500 megabytes when Gmail is unlimited. It's because the more space you have, the more time backup takes, the more complicated disaster recovery is. We have to constantly communicate our policies," he says. Like a lot of big enterprises, SBLI USA has had to block access to public email systems from company-owned computers as a security measure, and it has had to limit space in Exchange for most users because of the cost of storage.

Even then, he says, email is still a headache.

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Over the next few years, we'll see greater integration across [messaging] tools.

ROB KOPLOWITZ, ANALYST, FORRESTER RESEARCH

"People keep email in their inbox the same way they keep files on their desktop, to keep them handy. They send the same file back and forth as an attachment until you have 10 versions that you have to store."

For Oakland County's Bertolini, management is the challenge — managing passwords, and managing Outlook's .pst backup files when they get too big. At least, he says, when those files get too large, they start to generate error messages. "We find out about it when [users] have a problem," Bertolini says with a sigh.

"In one case, we discovered thousands of emails dating back to 2001," Bertolini recalls. "And the real problem is that most of them dealt with trivia like meeting for lunch. There's a cost to maintaining and managing email over time."

IT's biggest email-related burden is simply uptime, says Radicati. "The overriding concern for IT is making sure that it's up and running and available," she says.

Email in the Cloud

So what's IT supposed to do? Certainly, the cloud offers one of several ways to view email differently. Radicati is optimistic about email in the cloud. "It's absolutely the way to go," she says. "A lot of cloud-based email providers have archiving and compliance capabilities in place, and if you want more features, you can purchase them as an additional capability."

In Oakland County, Bertolini is investigating using Microsoft Office 365 in the cloud. "There's still a cost associated with storage, but part of our ROI analysis will be comparing the cost of storage in the cloud versus letting people keep more email," he says, adding that he's worried that if "you give them more storage, they will fill it up."

But he also sees other advantages. "If I can host email externally and still have the safety and security the county government needs, I can save millions in the long term. We'd need two to three people to manage Microsoft Exchange, but if I go to the cloud, I don't need those people. And in three or four years, I'm not replacing my mail servers."

Still, questions remain. "A lot of IT departments are investigating moving email to the cloud," Radicati says, "but there is still concern about whether it will be private enough, secure enough and reliable enough."

Merging Communications Tools

Like many systems IT has to deal with, email's boundaries are expanding, which means IT needs to begin thinking about email less as a silo and more as one component of a multimodal communications system.

Bertolini notes that the new generation of employees clamors for instant messaging — and he's not against it. "They use it to collaborate. When they have chat, they can get things done in real time." He's also looking at more videoconferencing, first on a one-to-one basis from desktop to desktop, and then from conference room to conference room, and then into a multipoint video arraignment system for the public safety team, because it saves having to transport the county's prisoners among facilities.

Fortunately, these communication mechanisms will start to merge, analysts predict. Two to five years from now, email won't look tremendously different, but we won't talk about it as a stand-alone tool as much as we do today, says Radicati. Instead, we'll have a communications dashboard that includes email, instant messaging and social media.

These hubs will come about thanks to new open APIs, not only for social media applications like Facebook and LinkedIn, but also for unified communications protocols like Session Initiation Protocol (SIP) and Extensible Messaging and Presence Protocol (XMPP).

Forrester's Koplowitz concurs. "Over the next few years, we'll see greater integration across these tools. Think about how messaging is integrated into Gmail — you don't have to switch back and forth because they're all integrated together," he says, citing similar functionality in systems from IBM (with Connections and Notes), Microsoft (with SharePoint and Yammer) and Facebook.

"We'll have a new environment with new aspects of communication," Koplowitz predicts. "Today they're different tools, but in the next three to five years, they'll be integrated." ◆

A Silicon Valley-based freelance writer, **Baldwin** *is a frequent* Computerworld *contributor.*

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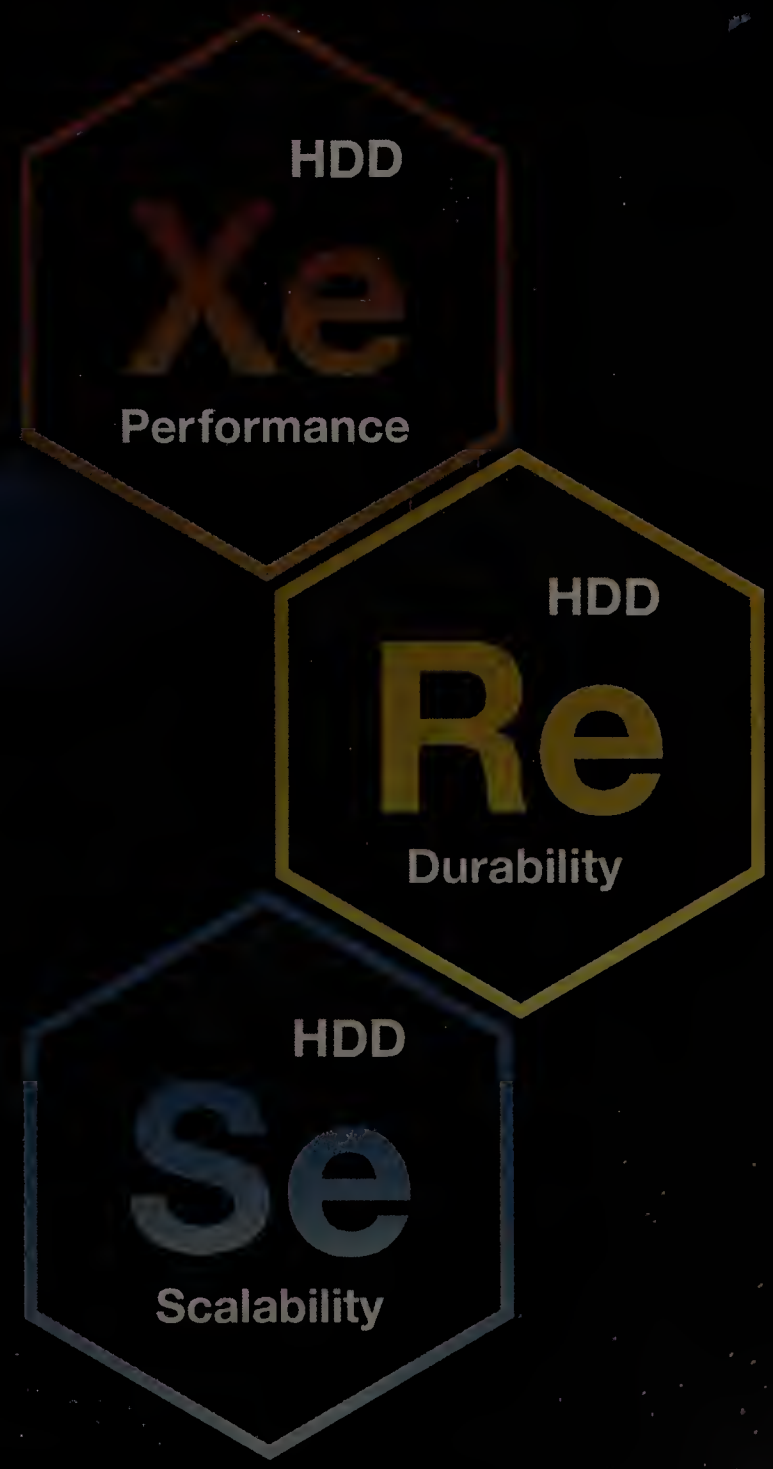

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DATA CENTERS UNDER WATER

Climate change is causing some IT leaders to consider relocating, or at least hardening, their facilities. **BY ARIELLE EMMETT**

GIVEN THE DIRE WARNINGS about climate change, some business leaders and IT professionals are pondering this question: How should data center managers handle the crop of so-called 100- and even 500-year storms, coastal floods and other ecological disasters that climatologists predict are heading our way?

Some experts suggest that managers of mission-critical data centers simply need to harden their existing facilities, other observers say data centers need to be moved to higher ground, and a third group advises data center managers to pursue both strategies.

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One thing is certain, experts say: Few IT organizations — even those that suffered or narrowly escaped damage during recent major storms — are thinking long term. Most IT leaders are, if anything, taking the path of least resistance and least expense.

For instance, the response to Hurricane Sandy, on the East Coast at least, "is nothing more than hardening existing data centers," says Peter Sacco, founder and president of PTS Data Center Solutions, a data center design and management consultancy in Franklin Lakes, N.J. On the other hand, he says, the fact that most computers are networked these days de-emphasizes "the importance of any single data center."

Internap, an IT infrastructure colocation company, is strengthening its most at-risk facilities, including the building at 75 Broad St. in lower Manhattan that flooded after Sandy hit. During the storm, fuel pumps shut down and Internap switched to a 1,200-gallon reserve fuel tank on a higher floor to keep servers running.

"No one expected Sandy to become as catastrophic as it was," says Steve Orchard, Internap's senior vice president of development and operations. Between Sandy and 2011's Hurricane Irene, "we're seeing a trend that's a little alarming," he adds.

The company has announced that it's building a new data center in Secaucus, N.J. — outside the flood plain. "We take climate change very seriously, and it does factor into our new site selection," Orchard says.

Hurricanes Katrina and Rita in 2005, followed by Gustav and Ike (2008) and Isaac (2012), slammed into the Gulf Coast with such ferocity that IT executives at Entergy, a $10 billion electrical power company with 15,000 employees, abandoned the idea of a single data center in the New Orleans area.

Before Katrina hit, Entergy, which provides both nuclear- and fossil-fuel-generated electricity to 2.8 million customers, had its corporate headquarters in New Orleans and a single data center in Gretna, La., just across the Mississippi River from downtown New Orleans.

"We knew the data center was in the storm's way, and we made a decision after that event to move the data center because we were holding our breath," says Jill Israel, Entergy's CIO. "We didn't have flooding in the immediate area of our data center, but there was no power, our lines were down and we had to run on our generator and keep topping it off."

By winter 2006, the company decided to create two mirror-image data centers in Jackson, Miss., and Little Rock, Ark. In Little Rock, the company retrofitted an old library with sturdy brick walls, moving hardware and critical applications from New Orleans piece by piece to the backup facility by 2008.

Finally, by 2010, Entergy had completed a brand-new $30 million Jackson data center. The company load-balances several systems, including email, between the two facilities, Israel says. "Moving applications from New Orleans involved quite a choreography plan. Subsequent to Katrina, we've had [major] storm events, including ice storms in Little Rock. But I no longer have to hold my breath," she says.

The company holds drills for hurricanes and other types of storms every year "to get better at responding," Israel says. "One of the things we quickly recognized was how effective a dispersed workforce can be. Our employees can do a lot more things from remote locations, and that has served us very, very well."

Yet not everyone seems to have absorbed the message to take heed. IT shops in both Europe and the northeastern United States seem to cling to the idea that superstorms are nonrepeatable freaks of nature. In some cases, even among those affected by major storms, vigilance plays a game of chicken with artful forgetfulness as managers set IT priorities.

Ignorance Isn't Bliss

"What was perceived as a safe area before may not be now," says Rakesh Kumar, a data center and infrastructure analyst at Gartner. He cites freezing temperatures, coastal flooding and other unpredictable weather events in Europe, and notes that tsunamis are a concern in Asia. "Until we have a major data outage, though, most clients are not calculating for risk or change; they're turning a blind eye to it," Kumar says.

He says that many of his European and U.S. clients are in favor of doing thorough long-term risk assessments and thinking proactively, he says. At least in theory.

Even now, months after Sandy, most East Coast-based companies aren't taking steps to relocate their data centers, experts say. "They're expanding in the same locations; they're not even thinking about moving," says Neil Sheehan, a data center architect and principal of Sheehan Partners, a Chicago-based architecture firm.

In fact, he says, "we are looking for expansion for our clients in New Jersey right near the coast, [near] sites that flooded." Sheehan says with proper surveys of 500-year-flood levels, data center architects can determine the ideal height of first floors, so that flooding, if it occurs, happens in the parking lot and not in the data center itself.

> **Our employees can do a lot more things from remote locations, and that has served us very, very well.**
>
> **JILL ISRAEL,** CIO, ENTERGY

Some are doing more than paying lip service to the idea of preparing for disaster. In lower Manhattan, at 140 West St., a Verizon switching center felt the full force of Sandy's flooding. Five sub-basement levels, including a Verizon cable vault, were submerged. Technicians struggled to mount emergency generators and pump water out through elevator shafts.

Since then, Verizon has had to extract 150 tons of damaged copper cable from lower Manhattan streets, its central office, headquarters and customer sites, replacing virtually all of it with weatherproof fiber cable protected in conduit. "If you take a fiber-optic cable and lay it in your bathtub, it probably will still work; fiber is submersible," says Chris Kimm, vice president of global customer assurance for Verizon Enterprise Solutions.

By replacing electrical infrastructure and bringing it up to higher floors, the carrier was able to get its own central office back online in about a week.

Some customers are following suit — moving critical infrastructure to floors that once housed rentable office space. And some are deploying new services, Kimm says, including mobile

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wireless, wireless IP and cloud computing solutions, to allow their employees to work remotely. Others are rerouting their telecom and data networks. "We even have some buildings that landlords have to redo, converting them from business locations to residences and deploying wireless services," says Kimm.

Even given all the damage, however, Verizon isn't considering moving its switching centers to a less flood-prone location. Instead, Kimm says, "we're armoring the buildings; we've done an evaluation of what all the risks are," he says. "We haven't gotten final solutions, but . . . you've got until [hurricane season starts in] midsummer before you have a significant risk of a future event."

Lessons Learned?

The impact of climate change and storms like Katrina and Sandy remains difficult to calculate. Not even climatologists can predict the frequency of extreme weather events as ocean levels and temperatures rise. But in the U.S., places such as Manhattan, Long Island, New Jersey, Miami, Virginia Beach, Boston, Washington, D.C., and even Seattle and San Diego are expected to see increased coastal flooding.

"I think it's absolutely compelling to look at the impact of recent storms, and also to look at statistics that show there have been more natural [severe] weather events, whether that's related to global climate shifts or other factors," says Jim Grogan, a business continuity and resilience analyst at 451 Research.

"Every single event, though, leaves lessons to be learned," he says. "Lessons come from the stories of the creative and innovative things data center operators did to keep their centers" going even in the worst conditions.

Though Sandy may have been a wake-up call for major data centers in the New York area to take some steps to harden facilities, it remains unclear how many will act on longer-term solutions — moving out of the city entirely, for example, or developing redundant and geographically separate facilities, or opting for third-party disaster recovery and cloud solutions.

Some larger IT organizations are looking at alternative locations for data center operations, says Grogan. "Multi-tenant data center operators in Atlanta, Virginia and other locations [are] seeing an increase of interest from customers in the Northeast," he says.

Many businesses that can afford disaster recovery solutions are considering turning to companies such as Cervalis for hosted systems in secure multi-tenant facilities outside major cities. An IT infrastructure provider with more than 200 large corporate clients, including global banks and software companies, Cervalis has hundreds of thousands of square feet of multi-tenant space in upstate New York, Passaic County, N.J., and Fairfield County, Conn., all a safe distance from floodplains.

Cervalis provides secured cabinets and redundant power, fully loaded (20 to 40 servers per cabinet), for about $1,500 per month per cabinet. Customers can use its facilities as either primary or secondary data centers, and the price is still cheaper than building redundant facilities on their own, says Zack Margolis, vice president of sales, marketing and business development at Cervalis.

Of course, not all businesses can afford that level of protection, and some small operations might not recognize the importance of data backups. But most organizations will have to find cost-effective means of ensuring business continuity, such as virtualized clouds or backup tapes mounted at small disaster recovery facilities.

Moreover, many businesses still cling to major cities. "Manhattan will still be in high demand because it is an interconnection hub to the United States," says Michael Levy, a data center colocation analyst at 451 Research. Further, financial companies still want to "touch their data" and have it near the center of trading action because they're concerned about latency, even though that's not an issue with fiber-connected facilities, even if they're in remote locations.

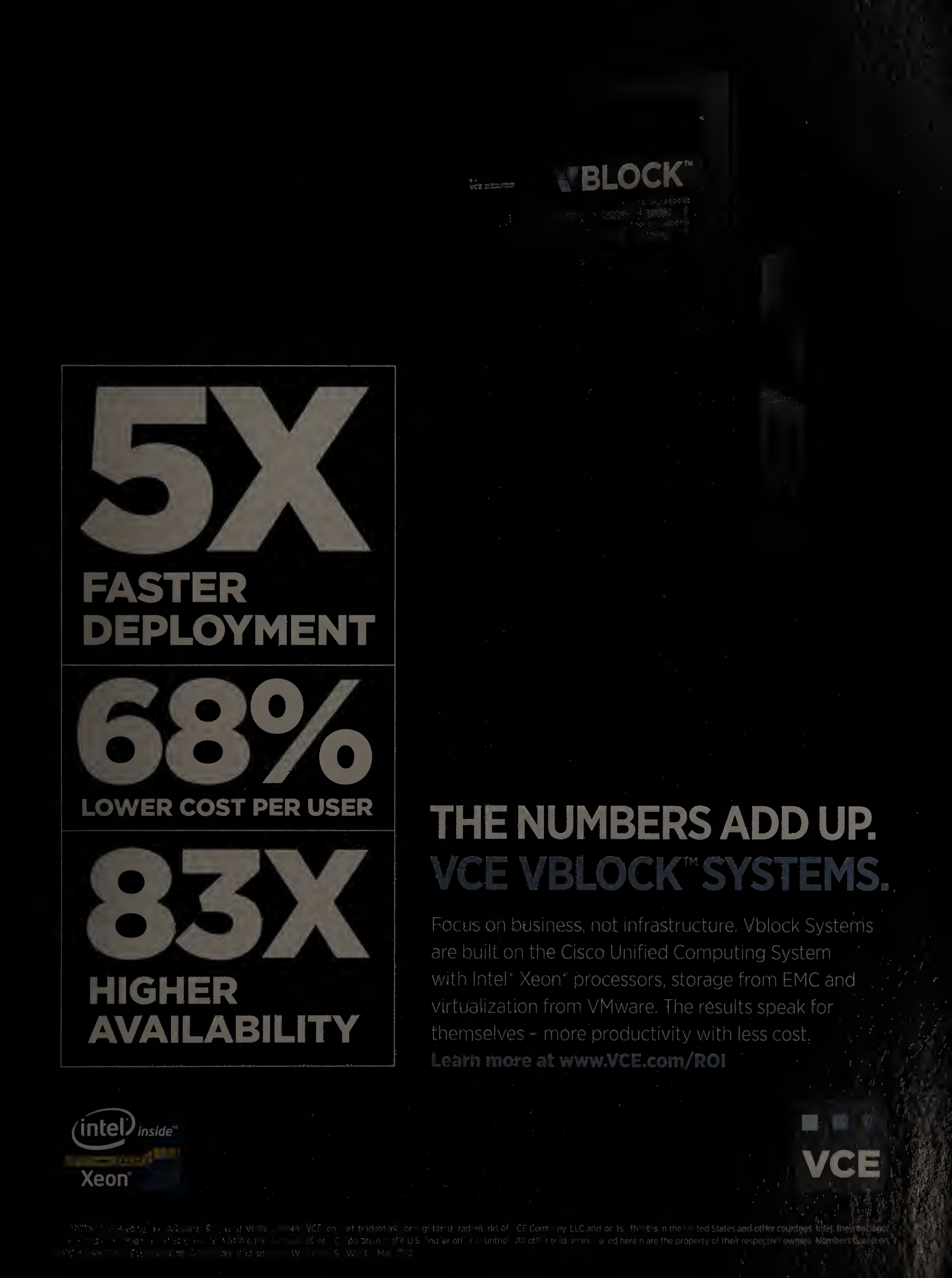
» A worker squeegees out the basement of the Verizon building in Manhattan following Hurricane Sandy on Nov. 1, 2012. The carrier was able to get its central office back online in about a week by replacing electrical infrastructure and bringing it up to higher floors.

Overall, Kumar insists, too few IT leaders are taking the signs of weather and climate change seriously enough. "We have had cases of coastal [flooding] where climate change has become an issue," he says. "In London and Germany, the winters seem to be getting slightly worse; we've had cases of component failure — small bits of electrical equipment freezing up."

Despite all of that, most IT managers still aren't willing to make proactive risk assessments to avert disasters. "When I mention risk assessments, [Gartner clients] say, 'Great point, we'll get engineering to complete a report,'" says Kumar. "But two months later, it's still at the bottom of the to-do pile." ◆

Emmett *is a professor of journalism and runs a technology-focused editorial and design company, Arielle Emmett & Associates, in New York, Pennsylvania and Beijing.*

REUTERS / CARLO ALLEGRI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Security Manager's Journal

MATHIAS THURMAN

Firewall Audit Gets Prioritized

After a DDoS attack is discovered by chance, the audit can no longer wait until later in the year.

A COMPREHENSIVE AUDIT of our firewalls just moved up on my list of priorities. The urgency arises from a recent incident that, fortunately, wasn't as bad as it could have been.

Around the world, we have over 60 individual firewalls. We use a centralized platform for managing the rules and baseline configuration, but it's still important to audit every firewall to track down the inevitable inconsistencies. We had scheduled that audit for later this year, but now we're planning to do it much sooner.

Last week, while troubleshooting a problem with network performance at a large overseas office, our network team decided to monitor the traffic leaving the office. Bad news: The firewall and router logs showed a massive amount of traffic destined for a single host in Vietnam.

The traffic originated from hundreds of externally addressable IP addresses on our internal network. This was highly suspicious, since we use internal private IP addresses for our protected network.

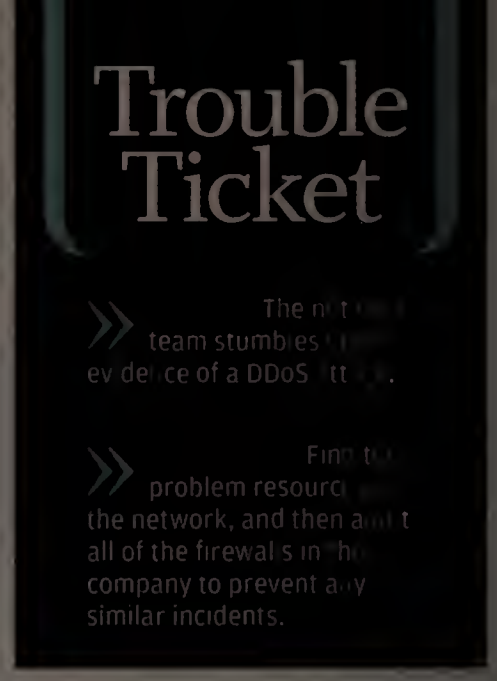
I assembled our crisis action team, since it looked as if we had been hit by a distributed denial-of-service (DDoS) attack. Of course, we immediately modified the firewall rules to block access to the destination IP address. Next, we enabled antispoofing rules on the affected firewall interface to block traffic originating from public IP addresses on our internal network. Then, we enabled anti-DDoS profiles for the firewall, allowing us to control traffic floods and set a maximum number of concurrent sessions. These last two configurations, by the way, should have already been enabled — but more on that later.

the discussions about security! **computerworld.com/blogs/security**

We tracked down the affected device by locating the switch port it was connected to. It turned out to be an enterprise-class server that an R&D engineer had attached to the Ethernet port at his desk — which is a no-no. We used administrative access to install EnCase, a forensic examination tool, on that server and found something consistent with malware that was previously identified as opening connections to a server in Vietnam from multiple spoofed IP addresses. That sure fit the facts of our case!

We disabled the malicious service at once, and what do you know — the malicious traffic went away. That done, we moved on to a more thorough forensic examination. By sniffing the network traffic that had originated from the infected server, we found that there had been no data loss or unauthorized access. Those had been my real worries.

Running a companywide inventory, we found that same malware on some other overseas machines, and on some in our corporate office. Luckily, none of those resources had been as completely compromised as the first machine.



Preventing Future Incidents

With the damage contained, I drew up a list of action items. For one thing, it's apparent that we need to review our firewalls to ensure that basic configuration settings such as antispoofing and anti-DDoS are enabled. But I also want to look into why our security incident event monitoring (SIEM) tool didn't alert us that a server was communicating with a known malicious host. The incident also makes clear that we need to address some inconsistencies in our endpoint protection compliance, since the infected servers were not up to date with the latest pattern files. Finally, we recently enabled some advanced malware detection capabilities that are supposed to evaluate all downloaded executable files and run them in a sandbox environment to determine whether they are malicious in nature. I'd like to find out where the breakdown in that technology occurred.

But my No. 1 priority is that firewall audit. I'm sure that in addition to some basic interface configurations, there are gaps in the firewall rules base. ◆

This week's journal is written by a real security manager, ***"Mathias Thurman,"*** *whose name and employer have been disguised for obvious reasons. Contact him at mathias_thurman@yahoo.com.*

> **"As soon as we disabled the malicious service, the malicious traffic went away.**

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Unresponsive Suppliers Might Not Be That Into You

> You can do some things to make your organization more attractive to suppliers.

YOU WOULD THINK that in tough economic times, it would be easy to hire a supplier of almost any IT product or service. And if your enterprise is a name-brand behemoth, it probably is easy. But smaller fish can't always get suppliers to provide product information, respond to an RFI/RFP or deliver adequate support.

You can do some things, however, to make your organization more attractive to suppliers. Here are some ways to get the attention you deserve:

■ **Clarify objectives.** Confusing requirements take time to decipher and open the door to suppliers making assumptions. Some won't respond, reasoning that every assumption adds risk and that competitors with current contracts already understand your environment and need to make fewer assumptions. And proposals based on incorrect assumptions won't address actual needs.

■ **Make the RFI/RFP process easier.** While formal RFI/RFP processes increase the likelihood that supplier selection will be based on merit rather than collusion between buyer and supplier, extremely rigid purchasing processes can make things difficult. Find a good balance.

A year after issuing an RFP for an ERP system, one organization concluded that all the responses were too expensive and therefore decided to relax some requirements and broaden its search. Unfortunately, its procurement rules barred employees from speaking directly to potential suppliers, and the selection team had to find out things like which languages products supported through websites and third parties. An already slow process got slower, and everyone was frustrated.

An overly structured RFP template can also be trouble. A government agency released a 68-page RFP. The problem statement took two pages, and the RFP contained regulatory information, forms, templates and affidavits to be completed. Result: Many qualified suppliers didn't respond at all, and most of those that did failed to describe how they would address the agency's needs.

■ **Actually award contracts.** Some organizations release multiple RFIs/RFPs but rarely award contracts. Over time, suppliers drop away, convinced that they will spend a lot of time preparing a response with no possibility of winning business.

■ **Pay a fair price.** Nobody wants to overpay, but squeezing suppliers until they can't make a profit is bad business. At worst, they could go out of business, leaving an unsupported product. More typically, requests for additional services at no additional cost result in support cutbacks. Since many IT products are complex and require significant after-sale support, poor supplier service can harm your ability to fully utilize the product.

■ **Know your weight class.** Large suppliers target large organizations that have big budgets and name recognition. Smaller organizations that hire major suppliers often find they don't receive the attention they expect. A smaller supplier that's hungry for your business is often more responsive.

I know of one midsize company that outsourced its data center to a large, well-known supplier. After repeated service problems, one of the supplier's executives admitted that its best staffers were reserved for its largest clients.

In the end, if you aren't a Fortune 500 company, your best bet may be to go with a smaller vendor. Sure, it's easy to get approval to hire a household name, but a second-tier supplier may be able to dedicate more resources to you. You'll be impressed how well things can go with a supplier that's as invested in your success as you are. ◆

Bart Perkins is managing partner at Louisville, Ky.-based Leverage Partners, which helps organizations invest well in IT. Contact him at BartPerkins@LeveragePartners.com.

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GRADS: A Splash of Cold Water

THINKSTOCK

HIRING PROJECTIONS for new graduates are down (see below), and those grads who do get interviews need to focus on the basics. According to HR consulting firm Adecco, 34% of the 500 managers it surveyed said that the inability to directly and clearly answer questions and articulate skills and experience during an interview was a common reason not to hire people between the ages of 18 and 24.

Big mistakes that respondents have seen this group make during interviews include:

- **Not dressing appropriately** (50%)
- **Showing up late or on the wrong day** (44%)
- **Failing to make eye contact** (33%)
- **Checking their phones or texting** (30%)
- **Fidgeting** (26%)
- **Exhibiting poor posture** (22%)

2.1%

Employers expect their hiring of new college graduates in 2013 to increase 2.1% compared with a year earlier. Just last fall, they were projecting a 13% increase this year.

SOURCE: NATIONAL ASSOCIATION OF COLLEGES AND EMPLOYERS' JOB OUTLOOK SURVEY OF 196 NACE MEMBERS, FEBRUARY - MARCH 2013

4.3%

Meanwhile, the average salary for newly graduated computer science majors has climbed 4.3% from a year earlier, to $59,977.

SOURCE: NACE'S APRIL 2013 SALARY SURVEY, BASED ON A COMPILATION OF DATA FROM THE U.S. BUREAU OF LABOR STATISTICS, THE U.S. CENSUS BUREAU AND A MASTER SET OF DATA DEVELOPED BY JOB SEARCH INTELLIGENCE

66%

That's the percentage of hiring managers who say they don't believe that new college graduates are prepared for the workforce.

SOURCE: ADECCO WAY TO WORK TELEPHONE SURVEY OF 500 HIRING MANAGERS, MARCH 2013

ASK A PREMIER 100 IT LEADER

Sonya Christian

The CIO at West Georgia Health answers questions about the **major issues facing IT** *in the coming year, and more.*

What major issues should IT departments be planning to address in the coming year? I see three – and IT should not just be planning to address them this year, but probably should already have a strategy in place for each.

The first is mobile device integration. How does the use of mobile devices impact the way your users access their applications? Do you have a position on BYOD (bring-your-own-device policies)? Do you offer your software via a downloadable mobile application? End users are more and more savvy and wish to use one device to cover both personal and business computing needs. Does your organization promote or prohibit this?

The second is cloud computing. Most organizations are using some type of cloud system, either private, public or hybrid of some type. Does your cloud infrastructure best support the needs of your organization? Are you exposing confidential, proprietary information by hosting it in a public cloud? Conversely, are you paying too much for a private cloud infrastructure to house data that could be kept with a public host?

Finally, business development. Are you leveraging your technology to bring new opportunities to your organization? IT should not only be aligned with organizational goals, but should also be a key player in developing new and emerging strategies for your organization.

If you have a question for one of our Premier 100 IT Leaders, send it to **askaleader computerworld.com**, and watch for this column each month.

I've been a software engineer for a few years now but wonder which path is more promising: analyst or developer? I believe that both paths have ample room for career advancement. However, I would argue that an individual with a combination of both talent pools will have the inside track. New applications are being developed all the time, particularly in the mobile environment. A good analyst knows how to translate and communicate the needs of the customer. Someone with development skills can take those needs and create applications that benefit the business. Someone who has skills in both arenas can help remove barriers and move projects forward quickly.

I have just earned a BS in computer science and am eager to put it to use. So far, the offers I've received are low-paying and otherwise uninteresting. Is this normal? I would encourage you to look for opportunities in a growing business, one that's in its early to middle life. Seek to partner your technical skills with business expertise. Most organizations are looking for someone who can help the organization grow. Technical skills are often outsourced to offshore resources. It's those "extra" skills that make you truly valuable to your company.

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Computer Professionals for NJ based IT Firm: Sr. Software Engineers Plan, design, develop, create, test & modify computer applications software & specialized utility programs. System development & implementation in web based applications. Developing interfaces & reports to improve efficiency. Troubleshooting client issues. Apply w/2 copies of resume to HR-Ecbytes Inc. 4475 South Clinton Ave, Suite 234, South Plainfield, NJ 07080

Senior Developer (Duxbury, MA): Work as part of the Information Technologies Team to configure user requirements and system solutions for the business community. MS (for.equiv.) in Software Engineering, Computer Programming, or a related field. Special req'ts: Demonstrated knowledge of the asset management industry specifically in areas of trading and portfolio management. This is a telecommuting position with some travel required to the Duxbury Office. Send resumes to Brian Donnelly, Managing Dir., Orbis Financial Solutions Group, LLC, 275 St. George St, Duxbury, MA 02332 w/ref to job code: OFS58.

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Vice-President of Engineering, Constant Contact Inc., Waltham, MA. Responsible for building new products & enhancing the existing product suite to improve customer exp, deliver world-class features & scale to meet the growth of the organization. Min Reqs: 8-10 years of exp. in hiring & managing high quality individual contributors, engineer managers & teams in software industry. Special Reqts: Demonstrated exp: (1) serving as service engineering Mgr.for software products within the SMB market (including managing of multiple software products across multiple platforms & int'l locations); (2) writing SMB software that successfully scales to 200 million + daily transactions; & (3) managing the development of high volume & multi-location SaaS, web-based apps using Agile methodologies & Web 2.0 technologies including Ruby. Mail resumes to Matthew Elliott, Sr. Recruiter, Constant Contact, Inc. 1601 Trapelo Road, Waltham, MA 02451 w/ref to Job Code CC1413. No calls please.

Software Engineer (Frankfort, KY): Design/develop applications for public pension benefit mgmt IT project. Req. Master or equiv combination of degrees w/Comp Appl or Comp System & knowledge of MS.Net, OO & Artificial Intelligence, proven by coursework taken or 6 mos exp with the skills. Send resume+salary req to: HR, Sagitec Solutions, 422 County Rd D East, Little Canada, MN 55117.

Software Engineer (Tampa, FL) Java-based financial application development. Req Master or equiv degree in CSci/CE or SW System & one-yr exp with SW dev occupations related to the job. Exp must include Java, J2EE, Apache POI, iTEXT, Subversion, Maven, DB2, Linux/Unix. Send salary reqt & resume to: OTF Technologies, PO Box 46723, Tampa, FL 33646

Software Engineer (Irvine, CA): Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Keeshia Moultrie. Please reference job # below:
Design, develop, modify, and/or test sw needed for various Google projects. Exp incl:
#1615.658; OOD & dvlpmnt; web srvcs dvlpmnt; distrib syst; debug; monitor; & multithread.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 Attn: Keeshia Moultrie. Please reference job # below:
Network Transport Engineer (Mountain View, CA) **#1615.1818** Design, configure, and implement Google's network to meet user needs. Exp incl: DWDM operation & troubleshoot in global telecommunications ntwrk environ; optical theory, transport technologies, & operation of 100Gbps DWDM, IP, & SONET/SDH syst; OTDR, OSA, BERT & optical power meters; CLI, TL1, SNMP, monitoring tools, IP, RADIUS, security, amplifiers, perf monitoring, transmission, link fault propagation, & fault signaling; scripting; ntwrk mgmnt automation & perf monitoring; Linux; defining & dvlpng detailed test plans; lab test & debug qualification of hw & sw; vendor mgmnt; & presentation of results to eng'g audience, incl execs.
User Experience Researcher (Mountain View, CA) **#1615.590** Take responsibility for Google product from conception to launch. Exp incl: social computing; analysis & observation of user behavior; prod design; web technology & standards; accessibility & universal design; internationalization & localization; & UX research methods & techniques.
SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test software needed for various Google projects. Exp. incl:
#1615.3958 C, C++, C#, Java, Python, &/or Android; concurrency; parallel & distributed syst; ntwrkng; relational database; applications & design patterns; OO analysis & design; test automation; & UI design.
#1615.1297 Jscript; HTML, CSS, & AJAX; C & C++; mobile sw dvlpmnt; SQL data analysis tools; Java; & tech. commun through oral presentations.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Keeshia Moultrie. Please reference job # below:
Software Engineer Positions (Venice, CA) Design, develop, modify, and/or test software needed for various Google projects. Exp incl:
#1615.5521 web application dvlpmnt; OOP, incl Java, C++, C#, &/or ActionScript; web technologies, incl HTML, CSS, & Jscript; UI design; data struct & algorithms; sw test, sw QA, & maint & release processes; scalable parallel & distrib architecture; & mgmnt of lifecycle of sw prod.
#1615.5664 OO lang. incl. Java; data struct & algorithms; web svcs, incl. Jscript, CSS, & HTML; application srvrs, incl. Apache; ntwrkng & databases; & human cognition & front-end user experience design.
#1615.1705 C++, Python, or Java; design, implement, test, & maint of moderate to highly complex subsyst; & dvlpmnt, test, & enhancement of prod & syst utilities.
#1615.3470 User-workflow analysis; Java; & GWT, & SQL.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 Attn: Keeshia Moultrie. Please reference job # below:
User Interface Designer (Mountain View, CA) **#1615.5830** Define the user model and user interface for new and existing Google products and features. Exp incl: design web-based prod for a consumer-orient website; CSS & HTML; Adobe Photoshop &/or Fireworks; UI & site design; & info architecture.
SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test software needed for various Google projects. Exp. incl:
#1615.3430 C & C++; Java; Unix &/or Linux; data struct, algorithms, & sw design; Python, Jscript, & AJAX; database design & SQL; TCP/IP & ntwrk program; distrib syst; dvlpmnt, test, & enhancement of prod & syst utilities; & design, implement, test, & maint of moderately complex subsyst.
#1615.3699 syst design; C; C++; multithread; STL; AJAX, XML, & Python; large-scale data index; Hashing, Dynamic Program, & mach learn for info extraction parallel & distrib computing & high perf storage syst.
#1615.1131 frmwrk design; Java code; Java reflection; multithread program; & automated test.
#1615.5962; C++, incl multithread; STL; parallel & distrib comput; & application & eval of mach-learn algorithms.
#1615.5043; C++, Java, or Jscript; distrib &/or multi-tier syst design & implement; OOD; algorithm dvlpmnt & implement; data struct & storage tech; UI design & implement; & QA & test.

Senior Systems Analyst (GeoDigm Corp., Falcon Heights, MN): Analyze User Interface & User Exp in ICON & eModel 3D Dental CAD/CAM software platforms; Eval User Interface usage &software workflow; Rec & implement enhancements to User Interface & verify impact; Apply knowledge of usability, human factors, & User Exp Design process to complete user exp; Conduct User Testing & deliver usability rpts; Define fn & tech req for Lab Mgmt Systems; Devp software & other integr routines req to suppl fn & meet reqs; Design software to simulate & visualize dental lab work flows; Supp customer tech needs in software platforms and software integration. REQS: Masters in Human Comp Interaction or related field; Prior exp must incl, and may incl coursework and exp gained while a student: Exp or course in user interface & user exp, incl Human-Compr Interaction Design, HCI Eval Methods, & Advd Comp Graphics; Exp or course in software devp & prog, incl Software Eng, DB Systems, & ERP & Enterprise Mgmt; 6 mo exp w/3D CAD software prog, w/ comp simulation & visualization res, w/web design using HTML, CSS, JavaScript & XHTML, and w/conducting user research & usability testing, focused on creating user friendly, intuitive web services; Exp in providing customer service and IT support and troubleshooting. Apply to: careers@nationaldentex.com

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 Attn: Keeshia Moultrie. Please reference job # below:
Manager, User Interface Design (Mountain View, CA) **#1615.337** Define the user model and user interface for new and existing Google products and features. Exp incl: C++; mgmnt of team of designers; HTML; Jscript; & CSS.
Software Engineer in Test Postions (Mountain View, CA) Design, develop, modify,and/or test software needed for various Google projects. Exp incl:
#1615.877 automated test syst & suites; implement & test subsyst; & test design &/or code changes.
#1615.3890 sw dvlpmnt; sw test & test automation; C++; Java; Python, Shell, TLC, or Perl; data struct & algorithms; OOD; relational databases; distrib computing; sw testing methodologies; & Linux.
SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test software needed for various Google projects. Exp. incl:
#1615.2116; computer pltfrms & browsers; prod or utility dvlpment, support, QA,& maintenance; & algorithms.
#1615.4960 4 of following: Java, Jscript, C, or C++; API dvlp. or design; Web authentication, authorization, &/or security standards; large-scale syst design; dvlpr workflow & tools; cloud technologies. 2 of following: Open federation standards; PKI; Browser & Jscript security; SSO syst; web svcs; & enterprise integration.
#1615.4517 Java or C++; OO technologies; SQL & database syst; parallel & distrib computing; & data struct, algorithms, & sw design.
#1615.3814 Adv datamine algorithms & recommendation syst; C or C++; Java; SQL; large-scale data index; hashing; dynamic program; OO design; parallel & distrib computing; & mach learn algorithms for info extraction.
#1615.843 C, C++, Java, or Python; compilers, assemblers, linkers, debuggers, & device emulators; design & implement interactive user-facing sw. syst.; OO design & dvlpmnt; Agile or XP sw. dvlp. methodology; setup & use of source control syst w/ continuous build integration; & multi-thread.
#1615.4057 C, C++, or Java; OOP; design & dvlpmnt of algorithms for large data sets; design & dvlpmnt of large sw syst; & parallel & distrib compute.
#1615.6467 design & analysis of complex sw syst; dvlpmnt, monitor, & optimization of distrib syst; OOD using program lang; & ntwrk-based & distrib protocols & communications.
#1615.1651 Ui dvlpmnt, incl gestural interaction or 3D interfaces; OpenGL or other graphic program environ, Java; multithread program; Android sw dvlpmnt kit; & dvlpmnt of Android pltfrm-level code.
#1615.3914 C, C++, Python, & Java; multithread & parallel program, OO dvlpmnt; parallel & distrib compute; large-scale data process info extraction; data struct; & design & analysis of algorithms.

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Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 Attn: Keeshia Moultrie. Please reference job # below:
Site Reliability Engineer Manager (Mountain View, CA); #1615.482 Design, develop, modify, and/or test software needed for various Google projects. Exp incl: mgmt & tech lead; architectural design; & operational mgmnt.
Software Engineer in Test Positions (Mountain View, CA) Design, develop, modify, and/or test software needed for various Google projects. Exp incl:
#1615.2384 design & development of frmwrks for functional, latency & integration test, multi-thread, & parallel program; dvlpmnt of algorithms for perf & maint of web srvrs; Java, C++, Python, & SQL; & Guice, JUnit, JMeter, Jscript, & CSS.
#1615.877; automated test systems & suites; implement & testing subsyst; & test design &/or code changes.
Site Reliability Engineer-Systems Engineer (Mountain View, CA) #1615.1503 Provide technical support necessary to ensure full availability of Google online services. Exp incl: Linux or Unix; syst eng'g; distrib syst; TCP/IP ntwrkng; perf tuning; & tool dvlpmnt.
SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test software needed for various Google projects. Exp. incl:
#1615.4239 OOP & design patterns; gameplay eng'g, game mechanics design & implement; dependency injection frmwrks; profile & monitor tools; scalable, fault tolerant & performant designs & solutions; HTTP, JSON & XML; distrib data struct, incl hash tables & consistency; asynchronous program & multithread or concurrency architectures; distrib or cloud computing; & srvc orient architectures.
#1615.3296 databases; Java; MapReduce; distrib syst; web applications; large datasets; HTML; Jscript; & data analysis.
#1615.5322 dvlpmnt, test, & enhancement of prod &/or syst utilities; design, implement, test, & maint of moderately complex subsyst; distrib info syst; Java, C++, or python; & sw eng'g, incl test, version control, release mgmnt, & front-end functional analysis.
#1615.4048 mach learn; distrib comput & distrib paradigms to design & dvlp decentralized, fault-resilient applications; data mine; text-process & text-mine; natural lang process; & stat modeling.
#1615.653 C++ or Java; SQL; OOP; high-perf & low-latency syst; algorithm design; data struct; databases; full prod dvlpmnt lifecycle; & deploy & sw dvlpmnt methodologies, incl Agile program & test-driven dvlpmnt.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 Attn: Keeshia Moultrie. Please reference job # below:
Research Scientist (Mountain View, CA) #1615.551 Research, develop, and test Google products. Exp incl: NLP; mach learn; sw eng'g; algorithms; & info extraction.
SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test software needed for various Google projects. Exp. incl:
#1615.6395 data struct; algorithms; sw design; C++ or Java; OOD; design & deplymnt of large scale distrib data process syst; UNIX or Linux; MapReduce &/or Hadoop; and large-scale data, analytics, & Info retrieval or bus intelligence.
#1615.3789 API design; multithread & distrib syst; web dvlpmnt; Java dvlpmnt; Jscript; CSS; & automated test frmwrks.
#1615.5540 syst design & implement; C++ & Java; lexical parser & NLP; distrib compute; web search engine, incl gather info, index, & srvng in real-time; online advertisement; knowledge representation & semantic ntwrk; & Wikipedia, incl mediawiki grammar, API, procedures, & standards.
#1615.497 data process w/ Python & C++; image & video process & mach learn; algorithm design; web dvlpmnt on client & srvr side; & syst mgmnt & maint.
#1615.3759 sw design & dvlpmnt; C &/or C++; Shell, Perl, or Python; Java; & data struct & algorithms.
#1615.4879 design & implement large scale distrib sw syst; C, C++, Java,&/or Jscript; Linux &/or Unix; application security & authentication protocols; pltfrm harden & test; & large-scale product sw syst troubleshoot.
#1615.1532 Java; J2EE; JAX-WS; JUnit; Perforce; Eclipse; GWT; & Guice &/or Spring.
#1615.490 GIS & real-time syst; distrib ntwrk mgmnt syst; Sub-GPS accuracy methods; automation algorithms; & data security & srvc reliability.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Keeshia Moultrie. Please reference job # below:
Test Engineer (NY NY) #1615.924 Design, develop, modify, and/or test software needed for various Google projects. Exp incl: test automation in C++, Java or Python; test techniques; scenario plan; & troubleshoot.
Site Reliability Engineer (NY, NY) #1615.3608 Provide technical support necessary to ensure full availability of Google online services. Exp incl: Unix &/or Linux; monitor tools; technical troubleshoot & perf tuning; & Python, C, C++, or Java. Trvl req'd.
User Interface Designer (NY, NY) #1615.4522 Define the user model and user interface for new and existing Google products and features. Exp incl: OO Jscript; modern Jscript libraries; vector & motion graphics; Python, PHP, Flash, & Actionscript; & Adobe Illustrator, Adobe Photoshop, Adobe InDesign, & Adobe After Effect.
Software Engineer Positions (NY, NY) Design, develop, modify, and/or test software needed for various Google projects. Exp incl: #1615.1536 sw dvlpmnt; Java; J2EE technologies; & XML technologies.
#1615.2609 Jscript UI toolkits; modular, OO Jscript; UI eng'g; browser compatibility; HTML, incl HTML5; CSS; Java; server-side web frmwrks; dependency injection frmwrks; analysis & troubleshoot large-scale distrib syst; high-vol or critical production srvc environ; & proj mgmnt.

CA based IT Co. has multiple openings at various levels at its Torrance CA headquarter and unanticipated locations across the U.S. for :Software Developer /Engineer to dev., create and modify computer applications software & specialized utility programs and customize software for clients Computer Programmer convert† & code project specifications Systems Analyst,- analyze user requirements to automate & improve existing systems & computer systems capabilities ; analyze commercially available software like SAP/Oracle; Project Manager, Systems Manager-Coordinate, direct project activities ;Bus. Analyst -analyze business & other data processing problems for application to electronic data processing systems; Travel and/or relocate required to unanticipated client sites/locations throughout the U.S. with expenses paid by employer. Please send resume with position desired to: Attn: HR, RJT Compuquest Inc., 23440 Hawthorne Blvd. Suite 210 Torrance CA 90505

Network Manager (Bensalem, PA): Coordinate changes to comp databases, test & implement database by applying knowledge of database mgmt systems. Perform data backups, disaster recovery operations, security measures to safeguard comp databases. Test programs or databases, correcting errors & making necessary modifications. Operate master consoles to monitor the perf of comp systems & networks. Reqmt: Master's degree or equiv in Comp Sci, Engg, Math, Tech, Bus Admin, or rel field. 2 yrs of exp in job offered or rel occupations of Database Admin, Syst Admin, Data Coordinator & Technician, or Data Mngr/Technician. Exp must include syst admin, networking, database admin, & data coordination. Exp must also include database merging & maintenance, & eval of data quality. Exp w App servers, Web servers, SAS, MS Access, MS SQL Server Reporting Services SSRS, HTML, JavaScript & SW testing req'd. Please email or fax resumes to info@hillispublicadjusters.com.

With 100+ branch offices located across the US, Experis US, Inc., is actively recruiting for the following positions. Roving employment to varying jobsites throughout the US. EOE/MF/DV.

Metro Milwaukee, WI -
Sr. Ab Initio Developers - Code #MKE100
SAP ABAP Developers III - Code #MKE110
IT Engineer/Developers - Code #MKE120
Oracle Business Analysts - Code #MKE130
Refer to appropriate job code when submitting resume to: Experis US, Inc., Attn. Robin Block, 100 Manpower Place, Milwaukee, WI 53212.

Metro Milwaukee, WI - Vendavo Delivery Specialists - Code #MI300
Metro Bellevue, WA - ETL Systems Analysts - Code#SE100
Refer to appropriate job code when submitting resume to: Experis US, Inc., Attn. Sally Warkaske, 100 Manpower Place, Milwaukee, WI 53212

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 Attn: Keeshia Moultrie. Please reference job # below:
SW Eng Position (Chapel Hill, NC): #1615.4355; Design, develop, modify, and/or test software needed for various Google projects. Exp. incl: C, C++, Python, & Bash; electronic schematic read & review; technical datasheet read & review; debug in early stage boot failures; DRM driver dvlpmnt; DisplayPort spec implementation; HDMI spec implementation; HDCP spec implementation; implementation of Exynos5 SoC features using C; implementation of SandyBridge graphics features using C; implementation of Tegra2 features using C; & design & implementation of firmware dvlpmnt. Trvl req'd.

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Capgemini Financial Services (Rosemont, IL), seeking experienced professional consultants with market-critical IT software development skills in financial services domain. Multiple positions available, incl.:
Managers (Ref#Q2-13A), Lead Consultants (Ref#Q2-13B) and Sr. Consultants (Ref#Q2-13C). All consulting positions require willingness to travel or temporarily relocate to projects at various unanticipated locations throughout the U.S. Some positions may allow for temporary telecommuting or other flexible working/living arrangements.All consulting positions are based out of our Rosemont, IL headquarters; worksite locations are varied, unanticipated and subject to change. Send resume to Resumeshr.fsgbu@capgemini.com and indicate Ref# in subject heading of email. No calls. EOE

Research in Motion Corporation (US), Irving, TX, positions are available:
TX7058 - IOT Cellular Specialist

Research in Motion Corporation (US), Rolling Meadows, IL, positions are available:
IL7065 - Software Test Specialist

Research in Motion Corporation (US), Herndon, VA, Irving, TX positions are available:
7054 - Data Network Specialist
Job may be performed from any RIM office in the U.S. or the employee's home office.

Submit resume to Research in Motion Corporation (US), to P.O. Box 141394, Irving, TX, 75014-1394 U.S.A., referencing appropriate job title and requisition number.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Keeshia Moultrie. Please reference job # below:
Software Engineer Position (San Francisco, CA) **#1615.6085**: Design, develop, modify, and/or test software needed for various Google projects. Exp incl: C & Jscript; dvlpmnt in mobile pltfrms; & mobile perf dvlpmnt.

Mphasis Corp has multi openings at various levels for the follow'g positions at its office in NY, NY & unanticipated client sites thr/o the US
1. **Info. Sys. Anyst*** - Ana. & provide sys req & spec.
2. **SW Dvlper*** - Design, dvlp & modify SW sys.
3. **Sys. Architect Dvlper*** - Dvlp IT architecture
4. **Graphic UI Desgr*** - Design UI & perform UAT
5. **N/W Infra Eng*** - Maintain & TRBL n/w, design, dvlp, install n/w infra appl.
6. **Business Operation Anyst*** - Ana bus process thru app of s/w sol.
7. **IT Mgr*** - Plan & manage the delivery of IT proj.
8. **Enterprise Svc Engagem't Mgr*** - E2E sale of IT svc/prod.
9. **Eng Engagem't Mgr*** - Manage & direct business integration of proj activities.
10. **Mkt Dvlpt Mgr*** - Promote IT svc/prod. & impl bus plans.
Must have a Bachelor/equiv and prior rel. exp, Master/equiv, or Master/equiv and prior rel. exp. Edu/exp req vary depending on position level/type. *Lead positions in this occupation must have Master/equiv+2yr or Bach/equiv+5yr progressive exp. Travel/relo req. Send resume & applied position to: recruitmentus@mphasis.com or 460 Park Ave. S., Ste# 1101, New York, NY 10016 Attn: Recruit.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 Attn: Keeshia Moultrie. Please reference job # below:
Software Engineer Positions (Kirkland, WA) Design, develop, modify, and/or test software needed for various Google projects. Exp incl:
#1615.3659 OOD, incl design paradigms; code practices, incl design documentation, unit test, peer code reviews, & agile methods; & C++ &/or Java.
#1615.5233 C++ &/or Java client-srvr dvlpmnt; ntwrk program; concurrent &/or distrib syst; & debug & diagnosis of issues & analysis of user metrics.
Software Engineer Position (Seattle, WA) **#1615.973**; Design, develop, modify, and/or test software needed for various Google projects. Exp incl: oo program & design principles; dvlp web applications w/core Java libraries; frontend Java design & dvlp; dvlp web-based syst in high vol enterprise-class environ; distrib syst; and web prog test.

Interested candidates send resume to: Google Inc., PO Box 26184, San Francisco, CA 94126 Attn: Keeshia Moultrie. Please reference job # below:
Technical Account Manager (Mountain View, CA) **#1615.5782**; Provide technical support for Google's strategic partners to ensure the development and launch of new company products. Exp incl: tech troubleshoot; consult &/or proj mgmnt; & C, C++, Java &/or Python.
Software Engineer in Test (Mountain View, CA) Design, develop, modify, and/or test software needed for various Google projects. Exp incl: **#1615.3449**; C, C++, Python, or Java; oper syst, incl Unix & Linux; AI or mach learn; distrib syst; & ntwrk program.
SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test software needed for various Google projects. Exp. incl:
#1615.4122; Java & C++; HTML, CSS, & Jscript; data struct & algorithms; design scalable sw syst; mach learn; & distrib syst, prog lang theory & internet & oper systs.
#1615.4636; HTML; CSS; :jscript; C++, Java, Perl, Python, or Ruby; & team lead of sw proj.
#1615.687; C & C++; multithread; STL; parallel, scalable & distrib computing; statistical analysis of algorithms; graph theory & applications; & data mine & mach learn.
#1615.213; UI; Java, SQL, & Linux shell program; large-scale web application dvlpmnt; and large-scale data storage & indexing.
#1615.6861; design of large scale distrib syst; data process syst; distrib storage syst; & Java or C++.
#1615.2190 C++ or Java; OO analysis, design & test; Jscript, HTML, & CSS; Rapid prototype; & solve large-scale prob using distrib computing.
#1615.6185; C & C++; multithread; embed sw dvlpmnt; mobile device dvlpmnt; digital audio & video dvlpmnt; media playback architecture; & graphics rendering pipelines & graphics architecture.
#1615.3540; C, C++, or Java; info security & cryptography; ntwrk security; distrib syst.; design & conduct user studies; & statistical analysis of research data.
#1615.1206; C++ & Java; doc retrieval; & mach learn-based prediction syst.
#1615.3459; C or C++; Java; database design & SQL; HTML, HTML5, & CSS; dvlpmnt & test on Linux & Unix pltfrms; data struct & algorithms; sw design; distrib computing; & stats & fundamental math.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 Attn: Keeshia Moultrie. Please reference job # below:
Technical Solutions Consultant (Mountain View, CA) **#1615.1053**; Integrate Google products with customer technologies. Exp incl: XML, HTML, Ruby &/or Python; Unix or Linux syst admin & shell script; TCP/IP, HTTP, HTTPS, SSL, & TLS; C, C++, Java, & Python; & SQL & Dremel.
SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test software needed for various Google projects. Exp. incl:
#1615.2301; Java, C, or C++; OO technologies; consumer-facing products; distrib syst., algorithms, & syst. design; coordination within & across multiple teams; syst. design & architecture; team or proj leadership; & mgmnt of entire prod dvlpmnt .
#1615.5336; iOS or Android app. dev.; Object-C program; C, C++, multithread, & STL; client/srvr program w/ TCP/IP sockets; low-power designs for embedded syst.; Python program; mach learn for info extraction; SQL; & OOP.
#1615.4472; C, C++ & script lang, incl Python, Perl, Shell Scripting; oper syst incl Linux & Unix; adv data struct & algorithms & graph algorithms; OOD, test driven dvlpmnt & design patterns; perf analysis & optimization of sw syst; sw, process & test automation; multi tiered web svc arch; web search runtime (query processing) & index syst; DFS, MapReduce, BigTable or HBase, ZooKeeper; RESTful web svc (incl apache, OAuth, HTTP, json); massive parallel & distrib system's architectural tradeoff analysis; & event driven near real time stream process syst, incl Storm.
#1615.4170; algorithms; large scale applications; parallel & distrib computations; analysis & optimization techniques; data struct; mach learn; & C++ & Java.
#1615.4451; C++; Java; algorithms; database syst; parallel process; & distrib computing.
#1615.3437; syst security; risk analysis; implement & sw infrastruct; penetration test; code review; & web technologies x86 native code, & bytecode/interpreted lang.
#1615.1925; Java; C & C++; Git / svn / cvs; and HTML, CSS, & Jscript.
#1615.5260; problem & performance analysis of large-scale distrib syst; design of large-scale distrib syst; dynamic program; parallel & distrib compute; C++ &/or Java & cloud compute.
#1615.5010; mgmnt of prod dvlpmnt lifecycle; implement syst in OOL; web & application servers; C++, Java, Python, SQL, AJAX, XML, & XSLT; large-scale data index; dynamic program; mach learn for info extraction; parallel & distrib computing; & large-scale distrib syst, distrib file syst, & distrib database syst. Intl trvl req'd.
#1615.1257; design & analysis of computer algorithms & data struct; multithread program; C, C++, or Java; Python, Perl, Shell, or PHP; & UNIX or Linux.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 Attn: Keeshia Moultrie. Please reference job # below:
Site Reliability Engineer (Kirkland, WA) **#1615.6392** Provide technical support necessary to ensure full availability of Google online services. Exp incl: Unix syst admin; Shell; PHP; Perl or Python; technical troubleshoot, incl outage analysis, ntwrk troubleshoot, & crash analysis; perf tuning; & inter-computer ntwrkng, incl distrib syst.
Software Engineer Positions (Kirkland, WA) Design, develop, modify, and/or test software needed for various Google projects. Exp incl:
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SHARKTANK

TRUE TALES OF IT LIFE AS TOLD TO SHARKY

HAL MAYFORTH

Actually, It's That Guy Behind You

User in a manufacturing plant just doesn't trust computers or the IT department – or management, for that matter. "She was convinced we were monitoring her every move," says IT manager pilot fish. "I tried many times to reassure her that IT had neither the time nor the interest to keep an eye on 350 employees." Her steadfastness became solidified when IT gave her a screen capture tool whose icon, located down by the computer clock, was a set of binoculars. She told the fish that she knew for sure she was being watched now, since those binoculars were looking up at her and recording every move she made!

False Alarm

Call comes in from a frantic user: The power is out at the corporate data center's backup site. "I informed my supervisor of the situation, noting that none of our alerts had signaled any kind of power loss or interruption," says a pilot fish on the scene. "He immediately sent me to the site. When I arrived, I saw that lights were working on the exterior of the building and in the main hallways. I then checked our UPS system and the mainframe area, only to find no errors or alarms or any indication that there had been any kind of power interruption." Fish heads to the caller's office and asks her exactly where and when the power loss had occurred. Her response: "Look around you. My office is totally dark!" Fish hits the light switch, and the overhead lights come on. "I don't use those," says user, "but everything is dead on my desk." Fish looks under the desk and finds the culprit: an overloaded power strip into which she had just plugged a new space heater. "After unplugging the heater, I reset the strip and told her to have a nice day."

The Personal Touch

It's the mid-1990s, and this pilot fish works for a big bank that's getting bigger in the era of mega-mergers. "To do all of the loan documents at the local branches, the bank had chosen a very nice DOS-based product from a small vendor," says fish. "The vendor was delighted, and everyone there did their best to make everything work for this huge client. They added staff and help desk and went to 24/7 support, but they still had that small-business feel. One time in the middle of a huge merger, I was testing the product against the legal requirements of the several states being added to the system. I navigated off a screen and got this error message: *This shouldn't happen, call Ian.* We chuckled and I called vendor support: 'Hi, is Ian there?' The immediate response was, 'Oh, @#$%!' but darned if they didn't get Ian on the phone to get it fixed – which he did."

» **This *should* happen:** Send Sharky your true tale of IT life at sharky@computerworld.com. You'll get a stylish Shark shirt if I use it.

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THORNTON A. MAY

Why Does IT Want to Be a 'Device Santa Claus'?

> Must IT be 'the store' that all departments come to for their digital kits?

AS A FUTURIST, I pay attention to what people pay attention to. As an anthropologist, I listen to the stories people are telling and are being told. As a *Computerworld* opinion columnist, I am fascinated by the inverse: What *aren't* we paying attention to, and what stories are *not* being told? Right now, the essentially unremarked blind spot of the IT industry is that the way we buy technology has changed — right down to the question of who does the buying.

Our industry is obsessed with the next big thing. It is what subscription research firms get paid big money for. It is what vendor slide decks are stuffed full of. "What are we buying now?" and "What should we be buying next?" form the master narrative of our ecosystem. But when the AIIM Executive Leadership Council recently convened in London, it examined the hypothesis that the questions of who buys and how they buy may be as important as the question of what we buy in shaping the future of IT. Our conclusion: Evolving IT buying behaviors deserve much more rigorous management attention.

Meanwhile, at the IT Leadership Academy, we asked a group of IT executives to think about the history and the future of IT purchase behaviors.

Tribal elders (IT executives who remember the age of punch cards and DEC VAXes) observed that each new technology (mainframes, minicomputers, PCs) progressed through a series of stages: initiation, contagion, formalization/control and maturity. Some of them contend that these patterns will continue to repeat. They look at the loss of control many organizations are experiencing with today's disruptive technologies — mnemonically rendered as the SMAC stack (social, mobile, analytics/big data and cloud) — and hypothesize that this is merely the contagion pattern repeating itself. This subset of executives believes that after a time, a semblance of centralized control over IT purchases will re-exert itself. We termed this group "The Pendulum Will Swing Backers."

Another group, the "Power to the People" contingent, sees evidence of evolutionary trends that will keep us from repeating that history. They point out that we've seen the focal point of buying shift from the IT department to the line of business, and they are not freaked out that today buying power seems to be moving to the individual.

Why, they wonder, does IT want to be in the technology provisioning business? Do we want to be "the store" that all departments come to for their digital kits? As Barbra Cooper, the recently retired CIO at Toyota Motor Sales USA, remarked, being a "device Santa Claus" is not truly strategic. IT can keep on fighting to be included in every purchase decision in the company, she said, but it will turn out to be a fight without end. The better long-term strategy (that is, looking out five years) is to educate business people about how to buy technology. As Cooper reasoned, "The people coming into the company are tech-savvy. They have a corporate purchase card. It is nothing for some guy in marketing to get himself a piece of the cloud. As a CIO, you don't have a clue until it is too late."

The danger is that most business people are not educated enough to buy non-toxically. That's why Cooper stresses education, with a set of rules: "Here is the sandbox. Here are the rules you have to play by. And when you go outside those rules, here are the consequences."

I would love to hear your thoughts. ◆

Thornton A. May is author of *The New Know: Innovation Powered by Analytics* and executive director of the IT Leadership Academy at Florida State College in Jacksonville. You can contact him at thorntonamay@aol.com or follow him on Twitter (@deanitla).

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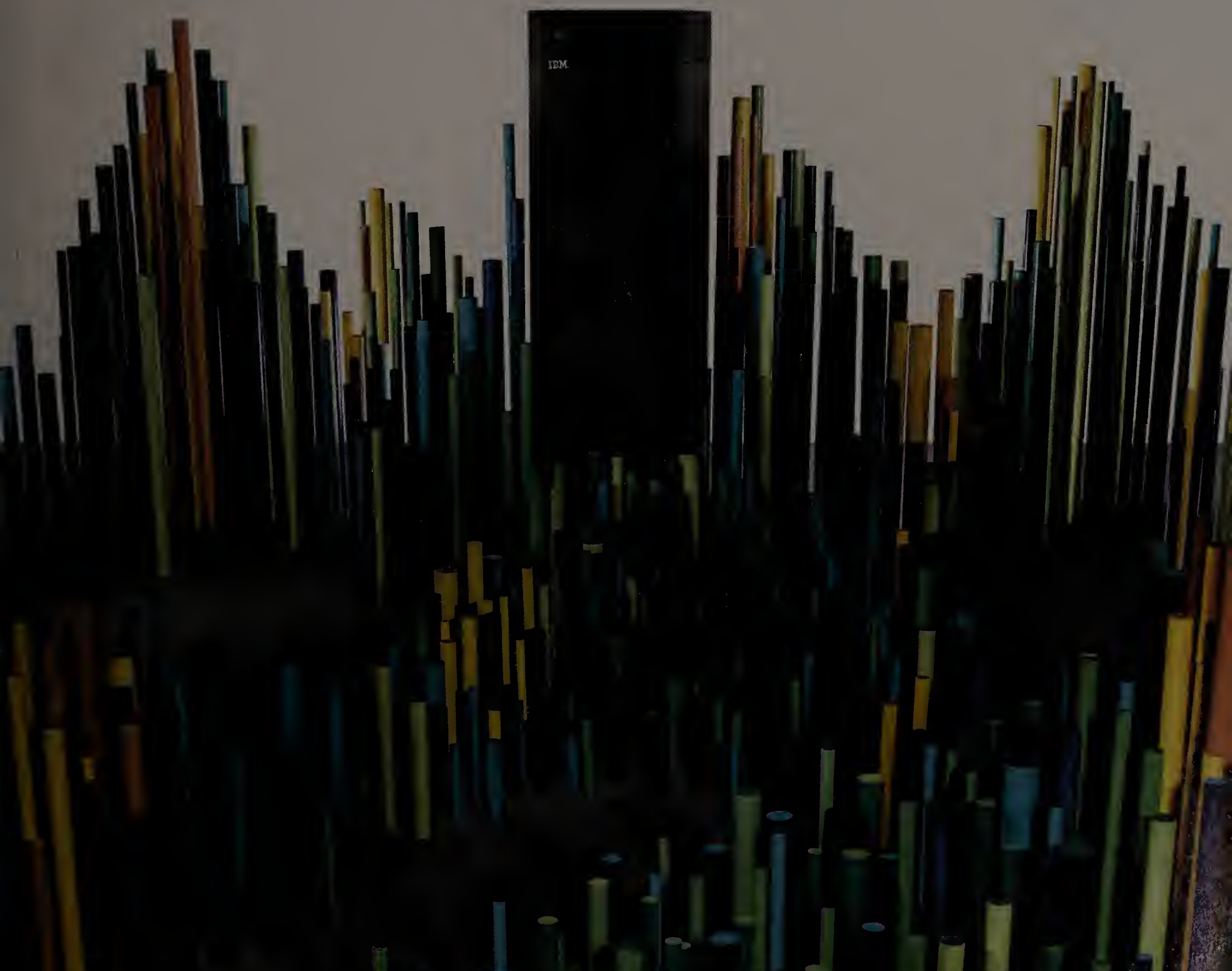

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